

THE STORY OF SRP:

WATER, POWER, AND COMMUNITY



Delivering water and power™



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Published by Salt River Project



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CONTENTS

Introduction	I
Chapter One: Early Settlements	1
Chapter Two: The Promise of Reclamation	9
Chapter Three: Building Roosevelt Dam	19
Chapter Four: The Water Users	33
Chapter Five: 'We Are in the Power Business'	49
Chapter Six: Pulling Together	61
Chapter Seven: Foundations of the Future	71
Chapter Eight: The Prunepickers	79
Chapter Nine: Territorial Imperatives	93
Chapter Ten: Shifting Gears	109
Chapter Eleven: Decade for Decision	123
Chapter Twelve: Cycles	135
Chapter Thirteen: Centennial	153
Epilogue	167
Abbreviations and Acronyms	171
Notes	173
Index	205



INTRODUCTION

In 1917 the federal government transferred operation of the first project completed under the National Reclamation Act, the Salt River Project (SRP), to a group of local water users in Arizona, the Salt River Valley Water Users' Association (Association). The transfer marked an important milestone in the early days of the nation's efforts to develop water infrastructure in the West. It also carried with it an understanding that would become a hallmark of future projects: that the success of reclamation projects required not only federal investment, but also a strong base of local support. As the first project operated by a local entity, SRP became the model of what reclamation could accomplish in developing Western lands. The fact that SRP's 1917 contract with the federal government is still in effect today testifies to the endurance of an approach that continues to be the foundation for managing water and power in the Valley.

The collective spirit that guided the Association's early development was not a certainty at its formation. When the Association was formed in 1903 as a mechanism for residents to put forward their lands as collateral for the federal funds to construct Roosevelt Dam, the idea of a common organization to unify the competing interests of Valley water users was viewed with skepticism by many who saw it as an unwarranted intrusion into private endeavors. The experience of local water interests up to that time was marked by litigation and division more than cooperative and shared purpose. In light of this background, the Association's formation and ultimate success in unifying disparate interests is even more significant. Valley residents ultimately realized the federal support to build the necessary water infrastructure for growth could only come through local collaboration and a pooling of interests that justified

such a large investment. This book tells the story of the enduring partnership of those common interests, spanning federal, state, and local governments and a range of private interests, which through its continuity withstood the uncertainties of weather, economic cycles, and political movements and transformed a fledgling territorial corporation into a regional water and power provider. In the process, Arizona and SRP grew together into a state of several million residents and an organization that today supplies nearly 800,000 acre-feet of water annually and delivers power to more than a million customers.

The founders of the Association clearly understood that Roosevelt Dam and the irrigation and power systems it fed were the keys to the long-term growth and prosperity of the Valley. This realization, born of drought, floods, and false starts, came with an understanding that the project would only be a success if it had a broad base of local support. Previous efforts to build a large storage dam failed principally due to a lack of consensus about who should bear the costs of the project and how the benefits would be distributed. The Association was founded by a coalition of commercial farmers and small ranchers; wealthy businessmen were balanced by corner grocers, “boosters” and “real farmers.” No one group could ever completely capture the Salt River Project and redirect it for its own purposes. The solution to most conflicts usually required expanding the community of those with a stake in the organization rather than limiting its reach. This became a key strength of the Salt River Project—its ability to represent a broad spectrum of local stakeholders. As its home community changed, marked by a shift from agriculture to an increasingly urban service area, SRP responded to the needs of its customers by strengthening its role as a power provider.

Power quickly emerged as an indispensable tool in meeting the challenges of building the ambitious, unprecedented Roosevelt Dam and pumping groundwater for a growing Valley. Lacking an available power supply, the dam’s engineers utilized the natural drop in elevation at the dam site to generate hydroelectricity. Before the dam was complete, the power canal generated enough surplus electricity to supply well pumps and industrial customers in the Valley, simultaneously reflecting growth and supporting additional development in a cycle that has continued for more than a century. With the completion of additional hydroelectric dams on the Salt River, SRP embarked on a program to electrify the Valley’s farms, houses, and businesses—years before the passage of the Rural Electrification Act as part of President Franklin Roosevelt’s New Deal—while constructing a financial engine that could sustain water development for generations to come.

The same values of innovation, foresight, and collaboration which enabled the success of the Association also emerged as key principles of SRP’s provision of this other essential building block of life in the desert. The addition of diesel power to SRP’s fuel mix in the late 1930s was only the first step in a constant process of diversification as the organization sought out, adopted, and constantly improved upon new ways of generating, transmitting, and delivering power. Over the years, successful relationships with SRP’s partners in providing

power to the Valley—from the planning and development of regional generation assets, to a series of territorial agreements ensuring efficiency, to the increasing integration and operation of the area’s power infrastructure as a unified system—have proven the value of cooperation in supplying reliable, affordable power to Valley residents. The organization’s relationship with those shareholders and customers has evolved in recent years to reflect emerging notions of stewardship and customer choice through programs that promote careful water use and energy efficiency by giving people more information and more ways to act upon it.

This is, in the end, the story of those who call the Valley of the Sun home. From its earliest conception, SRP was created by—and for—the communities it serves. Over time, SRP’s water and power services have helped ensure the successful achievement of its original purpose: the economic development of the Valley and the region. When the Association was formed in 1903, the population of Maricopa County was barely twenty thousand.¹ On his visit to the Valley just eight years later for the dedication of the massive storage dam that bore his name, President Theodore Roosevelt assessed what he saw as the bright prospects of a burgeoning community. To a crowd gathered on the steps of Old Main at Arizona State University, Roosevelt declared: “I believe as your irrigation projects are established, we will see 75 to 100 thousand people here. . . . You have the great material chance ahead.”² In the 106 years since his speech, the water and power provided by SRP have helped the Valley harness Roosevelt’s “great material chance” to a degree even the president might not have imagined—today, the Phoenix metropolitan area boasts over four million residents, placing it among the largest in the United States.³ Just as it has throughout its first century, SRP continues to build upon the achievements of the past in pursuit of a better future.



CHAPTER ONE:

EARLY SETTLEMENTS

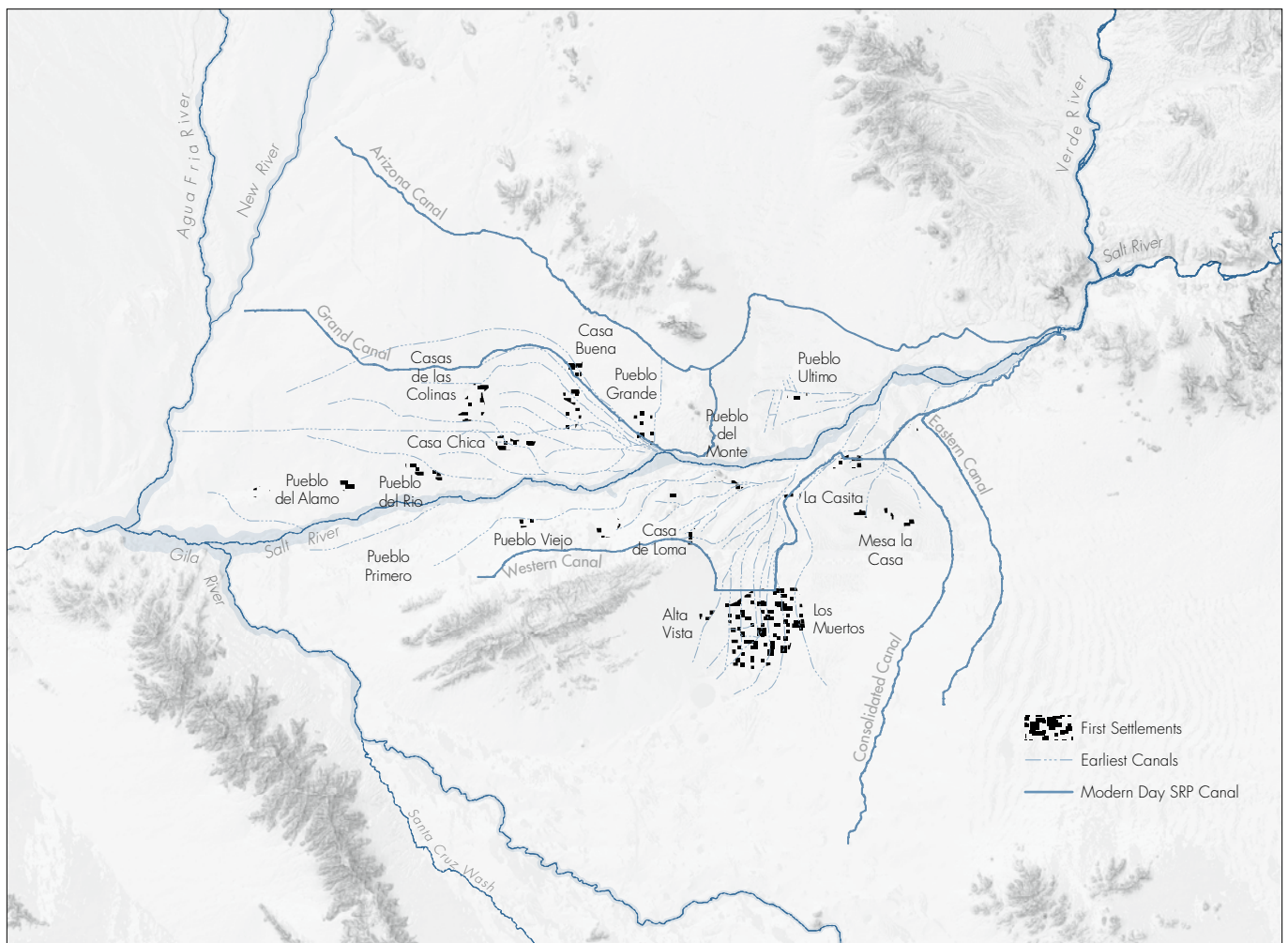
Agricultural development in the Salt River Valley began over 2,000 years ago when a group of people archaeologists call the Hohokam first settled the area. The Hohokam lived in the Valley for hundreds of years, from around AD 1–1450.¹ The culture's signature style of pottery was discovered over a significant, centralized area in the Valley.² The Sonoran Desert of the Hohokam's time was similar to today's desert, with freezing temperatures in the winter, hot summers, and annual rainfall averaging between seven and eight inches. The innovative pre-Columbian farmers constructed a vast system of canals and laterals that watered tens of thousands of acres of fertile farmland in the Valley. These canals, branching out from both sides of the Salt River, displayed a sophisticated understanding of irrigation engineering. The Hohokam primarily used stone tools to dig their complex gravity-based transmission and delivery system, which was designed for smooth and steady flowing water. Like their modern counterparts, the Hohokam experienced periodic drought and flooding, yet they sustained a thriving community of an estimated 24,000 to 50,000 people. Despite their long, successful life in the Valley, most of the Hohokam left the area around 1450, and their villages and canals fell into disuse.³ These early settlers demonstrated the need for a reliable water supply to support life in the Salt River Valley, as well as the potential success of such a system.

American settlement of the Salt River Valley began in the 1860s with the establishment of a US Army outpost at Camp McDowell, constructed east of the Valley in 1865 near the confluence of the Salt and Verde Rivers. Soldiers dug a canal from the Verde and planted several acres of forage crops, grain, and vegetables. The first private business in the Valley was that of John Y. T. Smith,

who received a contract for the collection of hay in the river bottom to feed Army mules and horses.⁴ In 1867, a group from Wickenburg, led by Jack Swilling, moved into the Valley and dug a ditch along the route of a prehistoric Hohokam canal. The head of Swilling's Ditch was on the north bank of the Salt River at a place that now lies under the north runway of Phoenix Sky Harbor International Airport.⁵ Swilling left the Valley after a few years and later died in Yuma. The stolid Smith stayed to become one of the area's most influential residents. In light of these early efforts, Smith and Swilling could be said to share the title of "cofounder of Phoenix."⁶

In 1870 the people living along Swilling's Ditch formed the Salt River Town Association and selected the "original townsite," a half-square-mile area between what is now Seventh Street and Seventh Avenue, south of Van Buren Street. They called the new town Phoenix, both in tribute to the departed civilization whose canals they would rebuild and as a prophecy of the Valley's promising future. Swilling's Ditch came to be referred to more often as the Town Ditch and, later, the Salt River Valley Canal.⁷

Earliest canals and settlements of the Valley, c. 1400

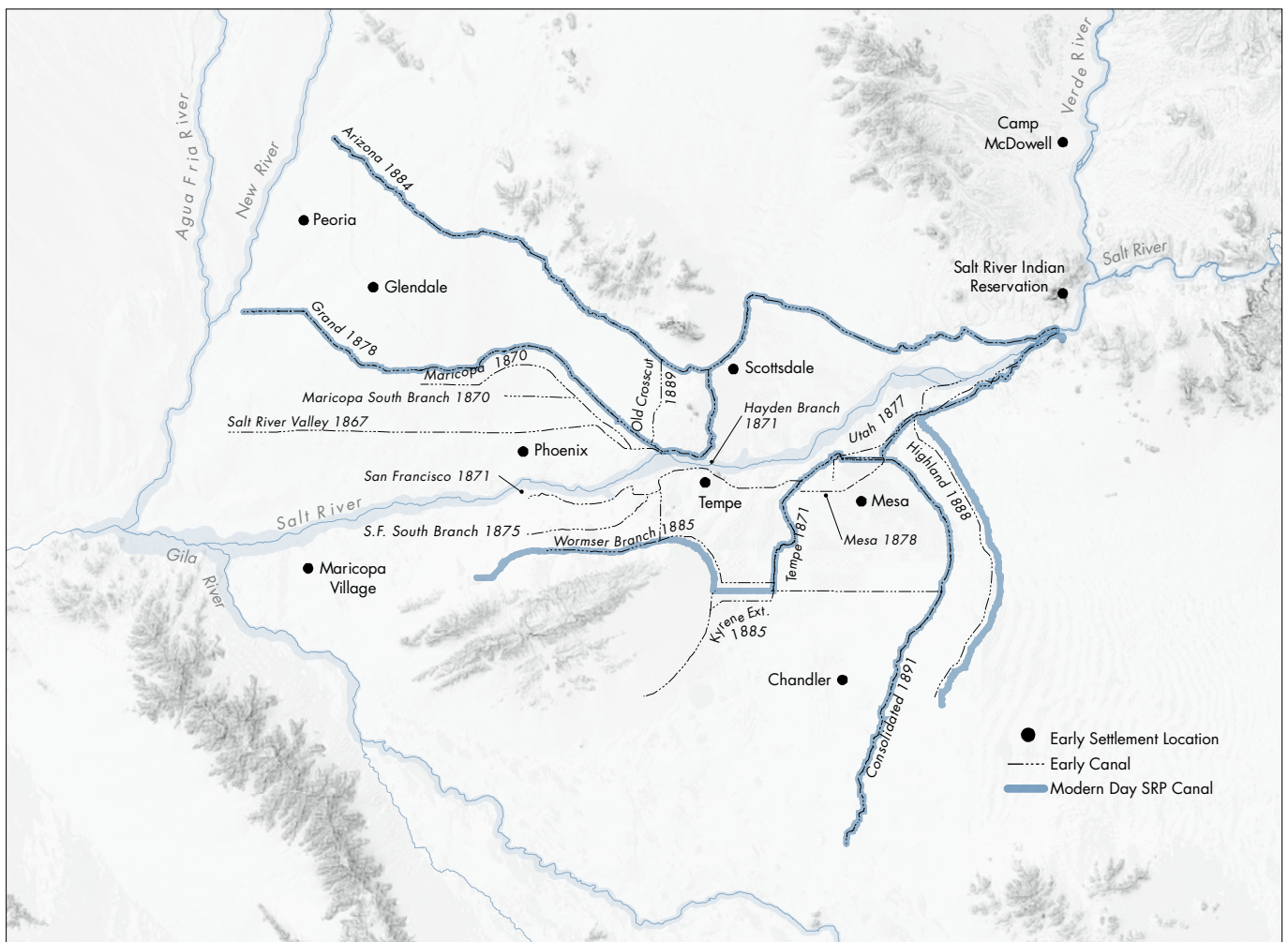


IRRIGATION AND FARMING

Despite the richness of the soil, farming in the arid Valley required irrigation. Like Swilling's group, many of the new canal builders used the remnants of Hohokam canals for their modern irrigation systems by simply renovating them. Damming the river to direct water into the canals was more difficult. The Salt River meandered through a wide, flat floodplain and frequently shifted its course, especially after a flood. Early settlers placed their rudimentary dams strategically in the river to raise the water level enough to force a flow of water through a headgate into a canal. To build such a diversion structure, settlers dragged large cottonwood and willow limbs into the river with the stump end upstream. Next, they piled brush and rocks onto the limbs, causing the branches to dig themselves into the riverbed. Early Valley residents often built the headgate, which regulated the flow into the canal, out of heavy timbers, with control gates that opened and closed.⁸

The dams and headgates required constant maintenance, so it was necessary for the

Modern canals and settlements of the Valley, pre-1900



farmer-owners to work together. Understanding the cycle of the seasons improved the chances of successful farming. Most of the water came from snowmelt on the distant mountains of the Salt and Verde watersheds. River flow generally peaked in the spring and decreased in May or June. Farmers planted and harvested wheat before the summer dry season began, and many vegetables did well from fall to spring. The best bet for summer was alfalfa, a hardy crop that grew fast with plenty of water and could survive the intense heat if water ran short.



Building a brush dam, 1906

Because of the arduous work involved, building an irrigation system was a community enterprise. Early canals operated as cooperatives, with shareholders obligated to contribute labor (in the form of maintenance) or funding according to their shares in the organization. The acreage served by the canal determined an individual's number of shares.⁹ The organization of the Tempe Canal Company was typical of the era. Canal construction began in the spring of 1871 on the south side of the river, with its dam and headgates several miles upstream from Hayden Butte. The company's founders each put up \$200 for tools and provisions. Nine other men agreed to work for shares in the company; one hundred days of work would earn a share equal to that of the men who put up cash. The canal was substantively complete by the mid-1880s.¹⁰



View of early Tempe and agricultural lands, looking southward from Hayden Butte, c. 1900

This model of canal operation shifted as the Valley grew. Canal companies moved from cooperative enterprises operated by farmers to corporations focused on development.¹¹ The Arizona Canal provided water for the area's first successful large-scale, multifaceted real estate enterprise. The canal was forty miles long, and its permanent dam and headgate were much farther upstream than any previously built at a spot called Granite Reef—where the river flowed over a stretch of solid rock that was ideal for the foundation of a diversion dam. Investors hoped opening 100,000 acres of

new land to farming would cover the cost of the canal and dam.

William John “W. J.” Murphy oversaw digging the canal and constructing the dam. Although many of the most prominent residents of the territory were involved in the Arizona Canal Company, Murphy and his wife, Laura, were most responsible for its success. In addition to building the canal, he cofounded First National Bank of Phoenix in 1883 to help finance

construction. To make the development more attractive to investors and settlers, the canal company constructed a wide boulevard known as Grand Avenue in 1887, which ran northwest from the Phoenix townsite through the heart of the lands served by the canal's waters. Along Grand Avenue, the company created the townsites of Alhambra, Glendale, and Peoria.¹²

In 1887, the Arizona Canal Company reincorporated as the Arizona Improvement Company, with many of the original founders as well as an impressive array of wealthy investors from San Francisco and Chicago. The Arizona Canal was large enough to supply water to all the Valley users north of the Salt River, and the Arizona Improvement Company soon acquired a majority of the stock of all the other northside canal companies: the Salt River Valley Canal Company, Maricopa Canal Company, and Grand Canal Company. By 1889, it had constructed the Crosscut Canal along the 48th Street alignment, from the Arizona Canal to the earlier head of the Grand Canal, so that all the canals on the north side could receive water from the Arizona Canal.¹³

The Arizona Improvement Company was not the only speculative venture in the Valley. Around 1890, A. J. Chandler joined a group of eastern investors in a development south of Tempe and Mesa. Chandler's group built the Consolidated Canal from Mesa to their lands, but by this time, existing landowners and canal companies had appropriated most of the water in the Salt River. As a solution, Chandler pumped groundwater to support his 18,000-acre ranch. He built the Valley's first hydroelectric power plant at a point on the Tempe Canal where it dropped thirty-five feet. This spot, which came to be known as Chandler Falls, is now on the golf course of Mesa Country Club. Electric lines conveyed the power some eight miles south from the falls to the Chandler wells. Within a few years, Chandler sold some of this power to Mesa and Tempe to light their streets, homes, and shops.¹⁴

ESTABLISHING WATER RIGHTS

Because of the amount of work necessary to obtain irrigation water and the irregularity of the flow, it quickly became apparent that communities needed a method of apportioning water. This was a concern not just in Arizona but throughout the arid West; most western states and territories adopted some form of appropriation to govern their water laws. This "doctrine of appropriation" recognized "beneficial use" as the standard for anyone to divert water from a river or stream with two important provisions. First, the right to use the water was subject to priority of date—the first person to take a given amount of water and beneficially use the water acquired a permanent first right to take that amount of water from the river. The next diverter on the river could take water only after the prior user's water demand had been satisfied. All other later appropriators had successively lower priorities and were "junior" to these appropriators with "senior" or earlier diversions from the stream. A second important concept was the attachment, or appurtenance, of a water right to the land on which the water was used. This meant that the land acquired the water rights and the rights stayed with the land, not the

owner. For example, portions of what is today Sky Harbor International Airport have water rights dating as far back as 1869.¹⁵

In 1863, Judge and politician William Howell drafted a 400-page legal code for the Arizona Territory. The Howell Code, as it came to be known, included a number of significant provisions related to water rights in the territory: it established that the state's surface water was public property and confirmed the principle of appropriation.¹⁶ In practical terms, these concepts meant that in times of shortage, the long-established farms would be most likely to get the water they needed for their crops, while newer farms might not. This system ensured that in a dry year at least some lands would have enough water to bring a crop to harvest, rather than allowing unlimited diversion that would doom all crops. In the early years of Valley development, canal companies assumed priority water rights. Owners of canal companies subscribed only the number of acres their canals would supply and distributed the water equally. They also enforced their priority rights in relation to other canal companies. A canal company with senior water rights paid close attention to diversions by water users upstream that diminished the flow to its diversion dam.

Like the physical works of an irrigation system, appropriation rights required almost constant maintenance, and litigation of water rights cases filled the docket of the Maricopa County court. In the largest and most important of the early water rights cases, the Salt River Valley, Maricopa, Grand, Mesa, Utah, San Francisco, and Tempe Canals claimed that the Arizona Canal (constructed later and farther upstream) was diverting their water.¹⁷ This case, *Wormser v. Salt River Valley Canal et al.*, became a landmark in Arizona water rights law. The decision and decree handed down by Judge Joseph Kibbey formalized many of the principles of Arizona water rights law, including priority rights, beneficial use, and the concept that water rights were appurtenant to the parcel of land to which they were applied and could not be transferred, sold, or rented for use elsewhere. The appurtenance of water to the land remains foundational to SRP's water delivery, and SRP continues to deliver water to lands in the Valley based on priority water rights. The Kibbey Decree was one of the essential building blocks of water rights in Arizona, and Kibbey himself went on to become the foremost legal expert in the development of SRP.¹⁸

With a successful network of canals modeled after the Hohokam's system and a legal framework for water rights in place, the Valley's growth continued through the last decade of the nineteenth century. As the Valley's irrigated acreage expanded, so did its transportation needs—the area lacked a direct railroad connection to other markets. In 1887, a local group formed the Maricopa and Phoenix Railroad, and the ubiquitous W. J. Murphy oversaw the work to lay thirty miles of track from Phoenix through Tempe south to a junction with the main line of the Southern Pacific Railroad. The first Southern Pacific train reached the Valley on July 4, 1887.¹⁹ A branch of the Santa Fe Railroad from Ash Fork and Prescott to Phoenix was finished in 1895.²⁰ These lines allowed Valley farmers to expand their production of profitable fruits and

vegetables for the national market. Thanks to the efforts of the Arizona Improvement Company, citrus fruit was the principal export, and by the mid-1890s farmers had planted 150,000 orange, grapefruit, and lemon trees in the Valley.²¹

The Valley's civic boosters were particularly interested in attracting well-off winter visitors who might move to or invest in the area, and health seekers who could benefit from the warm, dry climate.²² After traversing hundreds of miles of desert, travelers were no doubt impressed with the vast green fields, large groves of orange trees, and miles of cottonwood trees growing along the waterways across the Valley. The Valley's burgeoning infrastructure—including schools, churches, streetcars, railroads, and water delivery systems—left an impression on visitors as well.²³

Amidst this growth, Phoenix became the territorial capital of Arizona in 1889. At the time, there were more than 100,000 irrigated acres under cultivation and Valley boosters calculated that sufficient land and water existed for several times that much farming acreage. Efforts to provide for the continued development of the Valley carried on through the turn of the century. However, this growth required securing additional water supplies to provide for the increased population and agriculture—a challenge Valley residents joined together to meet through reclamation and a partnership with the federal government.²⁴



CHAPTER TWO:

THE PROMISE OF RECLAMATION

A cycle of floods and droughts near the turn of the century encouraged Valley landowners to look to the federal government for assistance in constructing dams and reliable irrigation infrastructure that would help protect their investments from the uncertainty of nature. Valley leaders understood the vital importance of storing river flows for future delivery via a system of dependable canals and laterals. A project of this scale required tremendous investment and coordination. The ultimate solution for the Valley was a partnership between a local organization, the Salt River Valley Water Users' Association, and the federal government. This enduring partnership balanced the economic risks of the project and ensured the Valley's success through a reliable water supply.

As American settlement in the Valley increased, a national conversation about the development of the West emerged around the idea of reclamation—reclaiming arid landscapes by building irrigation infrastructure.¹ The West held millions of acres where the soil and climate were excellent for farming but lacked a reliable supply of water. There were also hundreds of miles of streams and rivers that could be tapped for irrigation. Irrigation proponents saw a great opportunity to develop new lands or, in the parlance of the time, “reclaim” them for productive use.



Arizona Dam, an early water diversion structure on the Salt River east of the Valley, 1905

THROUGH FLOODS AND DROUGHTS

Following a devastating flood in 1891, the Arizona Territory entered an equally devastating dry period. The biggest problem during this time was not the lack of rainfall in the Valley but rather the lack of snow on the Salt and Verde watersheds—it was the gradual melting of snow that brought irrigation water to the Valley through the spring growing season. A serious drought struck the Valley from 1898 to 1904, causing agriculture in the area to decline and the economy to suffer.²

This seven-year drought marked a period of limited growth for the Valley. The depression of 1893 curbed the investments by eastern interests that had been the engine of Valley growth for the previous decade. Additionally, the weakness of the bond market hindered expansion plans for developers. As the drought worsened after 1898, Valley residents stretched water supplies increasingly thin.³ Owners of long-established farms receiving water from the early canals were largely able to survive the drought by enforcing their priority water rights, but landowners under the later Arizona, Highland, and Consolidated Canals could not make their company-issued water rights last through a summer of one inadequate irrigation cycle after another. Farmers abandoned nearly 30,000 acres of irrigated land in the drought years, almost all of it under those three canals.⁴

Valley farmers depended on the 13,000-square-mile combined watersheds of the Salt and Verde Rivers to supply their irrigation needs. Most of the Valley's water supply came from snow and rain falling on a vast area bounded by the White Mountains to the east and the Mogollon Rim to the northwest and extending to the upper reaches of Big Chino Wash near Seligman. Residents of the Valley understood the importance of maintaining a healthy watershed in order to enjoy a reliable water supply.⁵ The irrigation movement understood this connection as well—the slogan, “Save the forests and store the floods, make homes on the land,” coined at the ninth National Irrigation Congress in 1900, concisely expressed this watershed philosophy.⁶

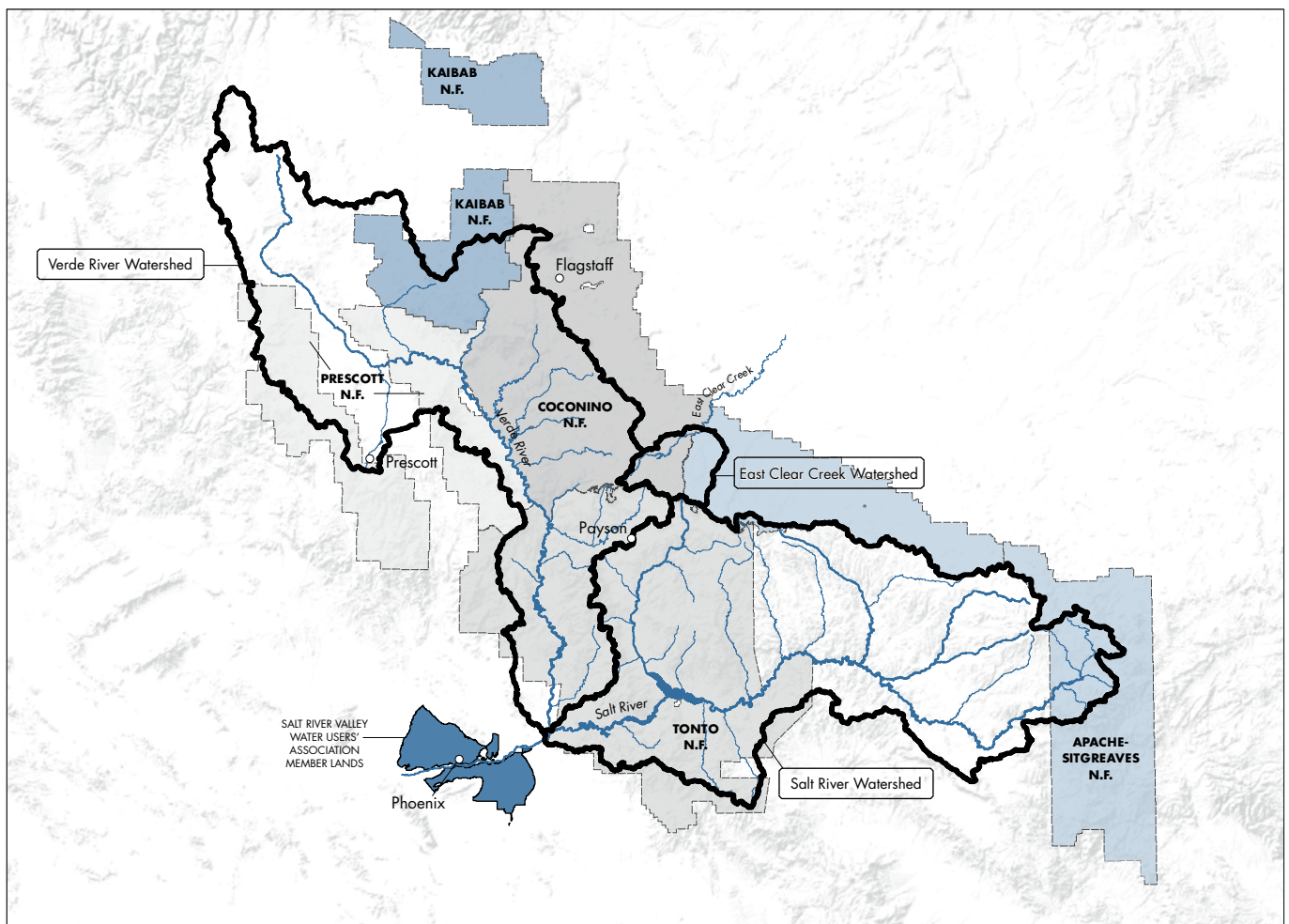
The United States passed two laws shortly before the turn of the century that impacted the Valley's watershed. The 1891 General Land Law Revision Act gave the president authority to “create forest reserves by proclamation.”⁷ Under the William McKinley administration, Congress enacted the “Organic Act,” or forest management act, in 1897, which established policies and procedures for enlarging and managing the country's forests. The act stated that “No public forest reservation shall be established, except to improve and protect the forest within the reservation, or for the purpose of securing favorable conditions of water flows.” This clarification solidified watershed protection as an important goal in setting aside forest lands. Between the presidencies of Benjamin Harrison and Theodore Roosevelt, the federal government set aside approximately 195 million acres under this act.⁸

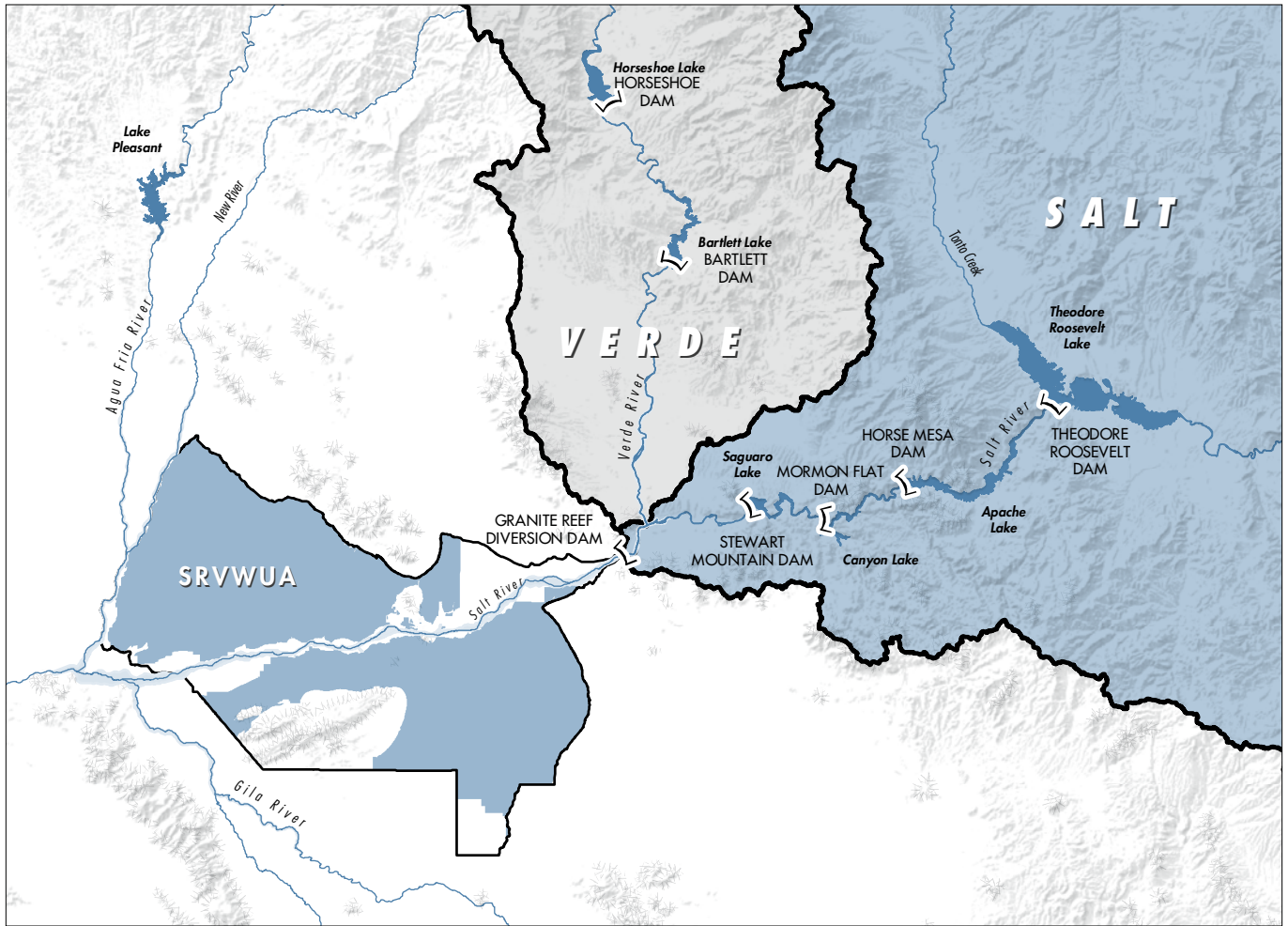
Pressure to develop national forests in the Arizona territory came from Valley farmers, who feared that settlers and large lumber companies in the mountains would remove timber,

lessening the amount of snow retained on the watershed during the winter months. The reduced snow retention, in turn, impacted the flow of the Salt and Verde Rivers.⁹ To address these concerns, in 1897 the Arizona Territorial Legislature requested that Congress reserve the unclaimed mountain timber lands within the watershed above the Salt River Valley.¹⁰ On August 17, 1898, President William McKinley signed Proclamation No. 19, creating what would eventually develop into the Apache-Sitgreaves National Forest in the northeastern portion of the Arizona Territory.¹¹

Within Arizona on the Salt and Verde watersheds, national forests continued to expand. The Tonto National Forest, including lands set aside primarily for the protection of the watershed supplying the Salt River Project, was created on October 3, 1905.¹² The early farmers and settlers in the Salt River Valley clearly realized the connection between a healthy watershed and a healthy water supply. Their early efforts to protect watershed lands remain an example of the careful planning and forward thinking that went into ensuring a more reliable water flow in the Salt and Verde Rivers.

National forest lands
in Salt, Verde, and East
Clear Creek watersheds





SRP system of dams and reservoirs on the Salt and Verde Rivers

THE IRRIGATION MOVEMENT

In the decades before the turn of the century, irrigation of the West had become a social crusade. Many politicians, bureaucrats, and journalists were convinced that the establishment of small irrigated homesteads on public lands would solve many of the problems of the West, if not the entire country. Businessmen and investors embraced this possibility and promoted the idea of private financing of the dams and canals needed to open large new irrigation developments.¹³ The investors hoping to create vast irrigation projects ignored the dawning reality that most of the irrigation water and productive land in the West was already being used, or at least claimed, by existing farms. The Valley represented the issues facing reclamation proponents: the best lands already had water rights claims that exceeded the average flow of the river, and new developments required large investments with no guarantee of a certain water supply.

Only a storage dam capable of holding floodwater would alleviate the problems caused by Arizona's characteristic cycle of droughts and floods as well as enable an expansion of irrigated farmland. Having initially failed to secure support from the federal government,

several schemes for large dams and reservoirs were initiated throughout the Valley in this period. The Hudson Reservoir and Canal Company launched the largest water storage plan. It filed claims on a dam site at the lower end of Tonto Basin on the Salt River in preparation for a 200-foot structure capable of retaining an ample supply of water for the fertile lands downriver. But the company could not attract the necessary financing.¹⁴ The Rio Verde Canal Company proposed the construction of dams on the Verde River to supply a 140-mile-long canal that would irrigate land in and around Paradise Valley (so named by company promoters). Funds ran out after initial construction efforts. The Agua Fria Water and Land Company nearly completed a diversion dam on the Agua Fria River west of Phoenix before failing in 1895.¹⁵

The 1894 Carey Act granted millions of acres to the states and territories to finance irrigation in the hope that local governments and private partnerships would construct storage dams and create irrigation districts.¹⁶ But the Carey Act failed to spawn widespread large-scale irrigation projects, because the states and territories could neither assume the financial risk nor provide the necessary technical and administrative expertise. Additionally, private partners were unable to raise the necessary capital due to the reluctance of investors. Despite the dreams of irrigation advocates, by the mid-1890s and in the midst of a national depression, bankers and financiers were reluctant to invest in western development.¹⁷ Irrigation projects in the West had yielded, said one promoter, only “the crushed and mangled skeletons of defunct corporations,” which had disappeared, “leaving only a few defaulted obligations to indicate the route by which they departed.”¹⁸

In this climate, California lawyer George H. Maxwell assumed a larger role in the movement. While embracing the agrarian ideals of the irrigation movement, he understood that only direct financing and control by the federal government could bring about the large new reclamation projects the West needed. Maxwell’s greatest contributions to the movement, though, were his energetic advocacy nationwide for irrigation policy and his formation of alliances with other large interests, such as railroads, that stood to profit from a growth of agriculture in the West. Essential to the success of Maxwell’s efforts was his ability to convince easterners that an irrigated West would constitute a new market for eastern goods, not a competitor for eastern farms.¹⁹

As the national irrigation movement grew, Valley interests organized a water storage committee to explore possibilities for both private and public development around the turn of the century. Benjamin A. Fowler, new to Arizona in 1899, soon assumed leadership of the local water storage movement. By 1900, the committee had developed a proposal to issue Maricopa County bonds worth \$6 million to build a dam at Tonto Basin and buy all the Valley canals. For this plan to succeed without creating a burdensome debt on landowners, it was estimated that 500,000 acres would have to join the effort, a substantial increase over the approximately 100,000 to 125,000 acres then being irrigated.²⁰

That fall, the water storage committee sent Fowler to Washington, DC, to lobby for enabling

legislation that would allow Maricopa County—still under federal control as part of the Arizona Territory—to issue the necessary bonds. In Washington, Fowler met often with Maxwell, who by then was the leading spokesman for western irrigation, as well as Frederick Newell, who was in charge of US Geological Survey (USGS) irrigation studies. Both of these men favored federally financed and federally controlled reclamation, and they soon convinced Fowler of the merits of the concept. Fowler, however, continued to lobby for the water storage committee's plan. Despite his efforts, Congress was unwilling to consider the Arizona proposal.²¹

While the water storage committee was developing its plans for the Valley, the USGS initiated a new series of studies of potential irrigation sites in the West. A "Water Supply Paper" by Arthur P. Davis of the USGS looked at the irrigation possibilities of the Phoenix area and, in particular, the advantages of the Tonto Dam site, which the Hudson Reservoir and Canal Company had initially proposed.²² These studies provided more technical information and clearly promoted the idea of reclamation as a federal undertaking. By 1900, western states had gained so much support that both political parties included a position on reclamation in their national party platforms. Two competing bills were introduced in the next congressional session. Senator Francis E. Warren of Wyoming proposed that the federal government build the storage dams and then turn them over to state control. The money for this plan would come from the annual public works appropriations. Senator Francis G. Newlands of Nevada wanted continued federal ownership and control of the completed project. He also wanted financing drawn from an independent fund created from the sale of federal lands within states that would directly benefit from reclamation. The Warren Bill had the backing of most western lawmakers, but President Theodore Roosevelt (who took office in late 1901) and his inner circle, which included Newell, favored the Newlands Bill. The Newlands Bill also had the advantage of promotion by Maxwell's national irrigation publicity apparatus and thus garnered growing support from many easterners. A combination of circumstances—including Warren's absence from Washington due to his wife's illness—allowed Newlands and Roosevelt to sway western congressmen toward supporting their bill, which passed on June 17, 1902.²³

The US Reclamation Act provided for government construction of irrigation infrastructure, financed by reclamation fund monies drawn from the sale of western lands. Upon completion of construction, local water users would take over operation of the project, at their expense, and repay the construction cost interest-free over ten years. The debt for these projects had to be borne equally among those benefiting from the projects. Ownership and oversight of the project remained with the federal government. The Reclamation Act reinforced the concept of small family farms that had been central to all federal land settlement laws; an individual could not receive reclamation project water for more than 160 acres. The act recognized local water rights laws as controlling the apportionment of waters under the planned federal projects.²⁴

Soon after the passage of the Reclamation Act, the Secretary of the Interior created the

US Reclamation Service (USRS) under Newell's direction. Newell was very familiar with the potential of the Salt, Verde, and Gila Rivers.²⁵ The Tonto Dam site had many advantages over other possibilities in Arizona. The flow of the Salt was much greater than that of the Gila, and the Valley already had an extensive system of canals and an irrigation community capable of growth ready to use the water. In addition, Fowler had been one of the most important lobbyists for the new law and certainly discussed the merits of reclamation in the Valley.²⁶

In October 1902, a mass meeting was convened to hear the water storage committee's report affirmed by Maxwell. He encouraged Valley landowners to recognize that the federal government would need a local organization with an elected, representational central body to gain control of all the canals, manage the water system, settle their water rights disputes, and make plans for project repayment to the government.²⁷ The report called for the formation of an association with 250,000 membership shares, one for each potentially irrigable acre, with all shares perpetually and inseparably appurtenant to the land to which they were issued. This association, not canal companies, would control access to the water stored by the dam.²⁸

THE SALT RIVER VALLEY WATER USERS' ASSOCIATION

An executive committee chaired by Fowler set about drafting Articles of Incorporation for the proposed association. The actual writing of the document was mostly the work of Maxwell and Joseph Kibbey, the former territorial district court judge.²⁹ Kibbey's decision in *Wormser v. Salt River Valley Canal* had established important principles of water law, but canal companies mostly ignored the decree.³⁰ Now he was in a position to put those principles into action. The articles prescribed how the association would be organized and managed and how it would represent landowners to the government. They also settled some questions of water rights and distribution. The planned project area included presently irrigated lands with established water rights, lands that had historically been irrigated but were left fallow in the recent drought for lack of water, and some lands that had never received water. It was important to balance the interests of all these lands. To do this, the articles recognized existing water rights, and in times of shortage, lands with prior rights would receive preference.³¹ The organization did not expect shortages, particularly given that information from the existing USGS studies and further work by the USRS allowed for close estimates on the amount of water that would be stored behind Tonto Dam. Therefore, the organization could limit the acreage of the project to match this amount and all member lands could be treated equally and receive a uniform quantity of water.³² Because of this equal treatment, both old and newly irrigated lands would pay the same share of the construction cost.³³

However, some members of the water storage committee objected to what they perceived as unequal benefits of the Kibbey-Maxwell plan. A group of established farmers led by owners of some of the earliest irrigated lands in the Valley felt they should not be required to contribute to the construction cost for a dam, because their water rights were secured.³⁴ An

outspoken leader of another minority opinion, Dwight B. Heard, was a relative newcomer to the Valley. Like Fowler, Heard was a health immigrant with important eastern connections, and he and his wife, Mae, soon became leaders in the community. Heard was one of the largest landowners in the Valley, and seeing himself as the natural leader of Valley irrigation interests, he challenged Fowler's direction.³⁵

The dissident group objected to the centralization of control in a single association and demanded the assessments for repayment of the dam reflect the benefits each individual received from stored water. They argued that landowners with existing priority water rights received only the benefit of river regulation (the prevention of floods and droughts) and should pay less than owners of lands benefiting from the capture and storage of floodwaters.³⁶ Despite these challenges, on January 20, 1903, the full water storage committee voted against every attempt to change the articles, rejecting the amendments offered by the "minority report." The new Salt River Valley Water Users' Association (SRVWUA, Association) held several public meetings to explain its operations and Articles of Incorporation.³⁷

The Association filed its articles with the Maricopa County recorder on Saturday, February 7, 1903. The following Monday, they were also filed with the Secretary of the Arizona Territory.³⁸ Until elections could be held, the articles named the original thirty council members, ten board members, and two of the four officers—President Benjamin A. Fowler and Vice President E. W. Wilbur. The Board of Governors appointed a secretary and treasurer at its first official meeting.³⁹

That same week, Tempe Canal Company shareholders voted not to sign up their lands in the Association.⁴⁰ These landowners knew they would receive their water in any case because of their prior rights, and they preferred to keep their existing system of operations under which they incurred minimal costs. The withdrawal of the Tempe lands did not pose an insurmountable hindrance to the larger project. Nevertheless, continuing efforts of "minority report" backers to circumvent the new Association and go directly to the Department of the Interior (DOI) began to cause resentment. Their attempts to amend the Articles of Incorporation were repeatedly rejected both locally and by the federal government. DOI officials made it clear that the Association plan was the only one they were considering. In fact, the USRS copied the Association articles and distributed them as a model to other areas in the West seeking federal reclamation funding.⁴¹

JOINING THE ASSOCIATION

The filings of stock subscriptions in the Association, which began in February, were slow at first.⁴² Only landowners within the area set forth in the Association's Articles of Incorporation could sign up, for a fee of ten cents per acre. The subscription process did not automatically ensure water from the project. At this early stage, joining the Association established that a parcel of land might qualify for water from a storage dam. In so doing,

owners agreed to abide by the Reclamation Act and put their land up as collateral to back the project. In order to receive water from the project, landowners had to obtain a government reservoir right. According to the Reclamation Act, individuals who owned more than 160 acres in the Association area would have to dispose of their “excess” lands, but there were no rules regarding when and how this should occur. Almost half the landowners who joined the Association in this early period had some excess lands.⁴³

Members who signed on knew there was probably not enough water for all their lands. Estimates indicated that the Salt and Verde Rivers could supply between 175,000 and 200,000 acres, including the 30,000 acres in the Valley that had not joined the Association but had early priority dates (the Tempe, Utah, Mesa, and Bartlett-Heard lands).⁴⁴ When subscriptions closed in July 1903, Association member lands tallied 195,000 acres.⁴⁵

The selection of SRP as one of the first five federal reclamation projects and the start of the project’s construction helped bring more shareholders on board.⁴⁶ On the north side of the river, the Association subscribed most of the land below the Arizona Canal and east of the Agua Fria River. On the south side, it included almost all the land west of the Highland Canal and north of the Gila River Reservation and South Mountain, down to the confluence of the Salt and Gila Rivers.

In April 1904, the Association held its first election. Voting was on an acreage basis—one vote for each acre subscribed in the Association. This voting structure, established in the Articles of Incorporation, reflected the obligation to repay the federal government for the cost of the project on a per-acre basis. Fowler was elected to continue the presidency he had been appointed to earlier. A month later, the membership of the Association ratified the contract between the Association and the federal government that obligated the latter to build a large storage dam and other works and Association members to pay for the dam through annual assessments. The contract formally placed the lien on the lands of Association members to back their promise to repay the construction cost. Given that no one could say for sure how many acres were obligated or what the cost would be—the government’s estimate was \$3.8 million—Association landowners were taking quite a leap of faith that the promise of reclamation was about to be fulfilled.⁴⁷

First SRVWUA
ballot, 1904

Salt River Valley Water Users' Association
ANNUAL ELECTION APRIL 5th, 1904.
OFFICIAL BALLOT
Seventh Council District

No. of Votes Elector Entitled to.....

NOTE:
(The number of votes marked in the spaces must not exceed the number you are entitled to as above noted, nor must the aggregate of votes cast for any one office exceed that number.)

So fold your Ballot that all above this will be exposed to the inspector.

FOR PRESIDENT. Votes.....
B. A. Fowler

FOR VICE-PRESIDENT.
E. W. Wilbur.....

FOR MEMBER OF COUNCIL
For 1 year term.
(One to elect)
J. B. Clark.....

FOR MEMBER OF COUNCIL.
For 2 year term.
(One to elect)
.....

FOR MEMBER OF COUNCIL.
For 3 year term.
(One to elect)
George Blount.....

FOR MEMBER OF BOARD OF GOVERNORS
(One to elect)
W. A. Wilson.....
Fred Tait.....



CHAPTER THREE:

BUILDING ROOSEVELT DAM

The selection of the Salt River Project as one of the first federal reclamation projects provided the federal funding and technical expertise to begin work on a major storage dam for the Salt River Valley. The SRVWUA served as a local organization to act as a liaison with the federal government to facilitate the project and its repayment. With these two pieces in place, the path was clear to begin construction on the project's signature piece of infrastructure: Roosevelt Dam. While the dam's construction progressed, the benefits of the reclamation project for the Valley were already apparent—hydropower, a more efficient water transmission system, and an effort to define the area's water rights. When completed, the dam supplied reliable water that fueled the Valley's growth.

PREPARING TO BUILD A DAM

Immediately after the May 1904 vote in which Association members approved the construction and repayment contract with the United States, the USRS purchased the assets of the Hudson Reservoir and Canal Company, which held claim to the proposed dam site. The site was forty miles around the mountain from Globe via a rough road and sixty miles east of Mesa, to which there was no road at all. Before construction could even begin, the USRS had to work out the challenge of transporting men and supplies to the dam site and determined that hauling freight east of Mesa would be cheaper than doing so from Globe, even with the cost of constructing a sixty-mile road over rough desert and mountainous terrain. Phoenix, Mesa, and Tempe offered to aid in the construction, recognizing the commercial advantage of having a road from the Valley to the dam. With congressional approval, each city distributed bonds for a collective total of \$75,000.¹

Construction of the road was one of the more difficult and hazardous components of the dam project. Apache laborers, who possessed skills in dry masonry and grading, signed on to the road construction crews. Some of the retaining walls they built using only fitted stones



Hauling machinery up the Apache Trail, circa 1900s

Apache Trail

In addition to enabling fast, less expensive transport of goods between Phoenix and Globe/Superior, the road through the Superstition Mountains became an important recreational destination after the completion of Roosevelt Dam. The new road was a popular route among private motorists for Sunday drives between Phoenix and Globe, a mere six-hour excursion. Numerous auto touring companies sprang up to meet tourist demand.

In 1916, the Southern Pacific Railroad began offering side excursions from its passenger rail service along the "Sunset Route." For an additional fee, passengers could disembark in Globe or Phoenix and board ten-passenger Cadillac coaches for the 115-mile journey. The route proved extremely popular, and the Southern Pacific's marketing of the journey led to the name "Apache Trail." The Apache Trail journey, and the colorful advertisements the railroad and touring companies produced to promote it, helped establish Arizona's place in the national imagination as an exotic and beautiful destination.⁶

with no mortar outlasted the concrete and steel walls built by the project's engineers.² The road was substantially complete by September 1905, and in its first month of operation moved more than 1.5 million pounds of freight.³ Regular coach service and a telephone line built along the road greatly facilitated communication, allowing USRS officials to live and work in Phoenix where they were directing other work.⁴

While the new Mesa-Roosevelt road (eventually named the Apache Trail) improved communication and travel, it was still a long and difficult journey, especially for heavily laden mule-drawn wagons. The engineers decided to limit the amount of materials imported due to the cost of transportation. Consequently, much of the early work involved finding building materials near the dam site. The dam itself was to be built from boulders cut or blasted from the nearby cliffs and bonded with mortar and concrete made from local deposits of sand and clay.⁵ The nearby Sierra Ancha Mountains provided the timber for the project.

Another immediate issue to be resolved was supplying electricity to the construction site. In his preliminary plan for Roosevelt Dam, Arthur P. Davis, now Chief Engineer of the Reclamation Service, observed that power was essential for drilling, moving rock, making and hauling cement, and other tasks.⁷ Because of transportation costs and the lack of locally available fuel to burn for steam power, Davis recommended that the dam include hydropower generation facilities, with the potential to transmit power to the Valley for groundwater pumping purposes once construction was completed.⁸ Electrical generation required water under pressure, and so it was necessary to divert a flow from the Salt River several miles upstream and convey it

in a canal nearly nineteen miles long to the cliffs above the dam site. Workers blasted a tunnel, or penstock, through solid rock which delivered water to a generator in the powerhouse just downstream of the dam. Crews completed construction of the diversion dam, power canal, and tunnel in less than a year's time and hydropower was available onsite by 1905.⁹

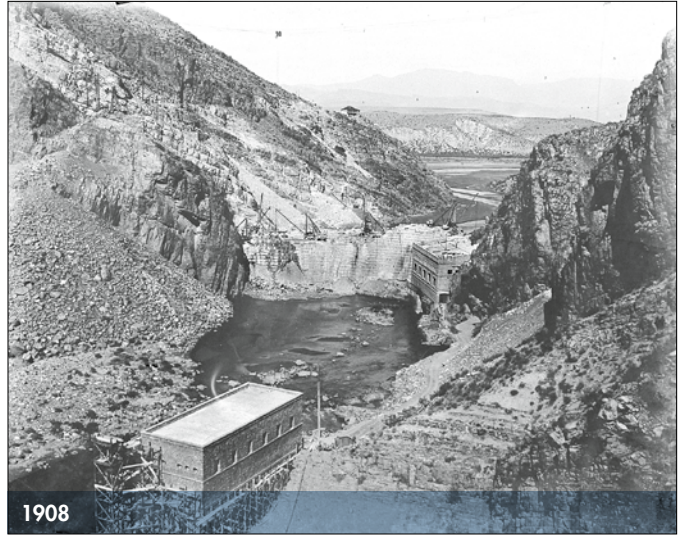


Top left: Preparing the foundation of Roosevelt Dam, laborers excavating down to bedrock, 1906

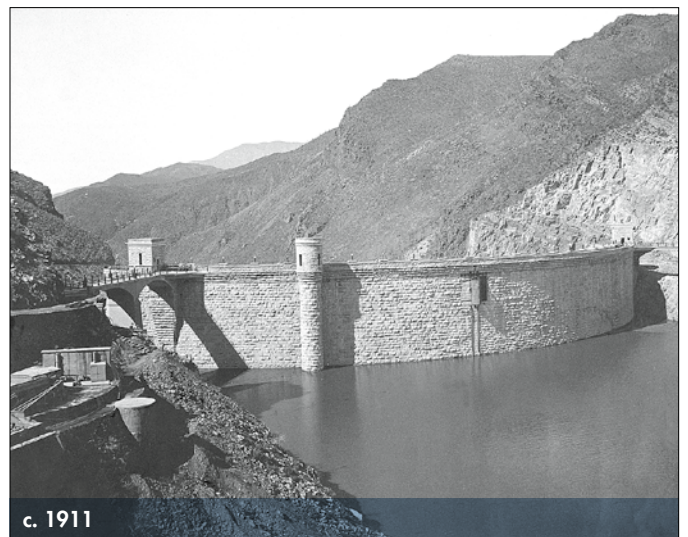
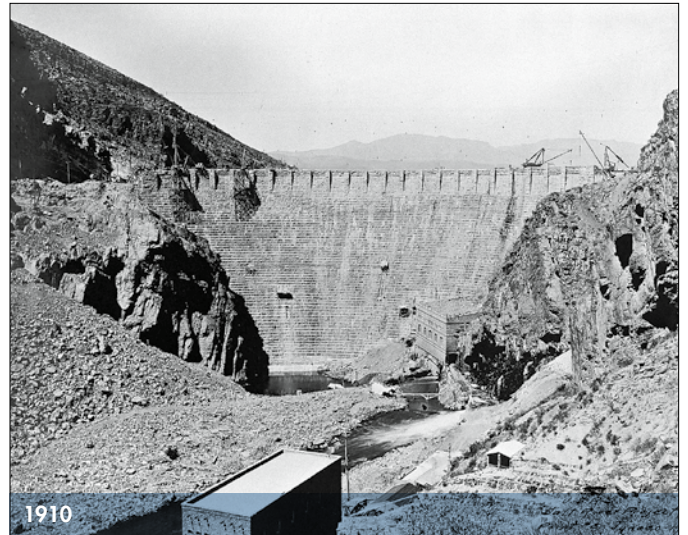
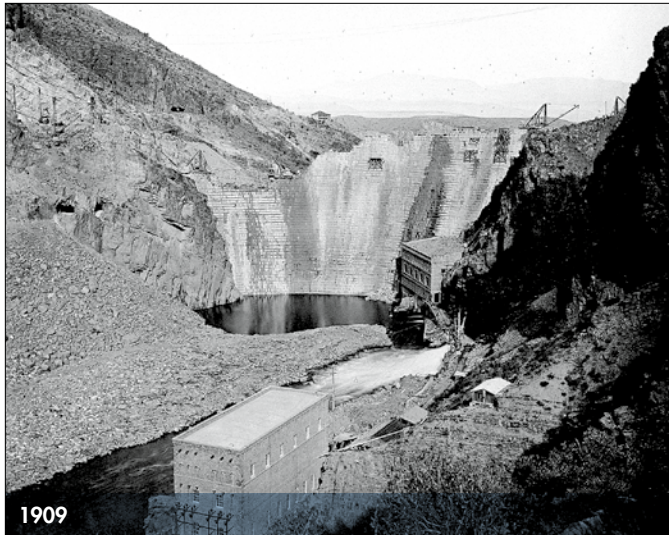
Top right: Flood during the construction of Roosevelt Dam, 1908

Bottom: Building up from bedrock, layers of quarried stone, 1907

1904 1905 1906 1907



• 1908 ••••• 1909 ••••• 1910 ••••• 1911 •••••



Series depicting construction progress on Roosevelt Dam from various vantage points, 1904–1911

CONSTRUCTION OF ROOSEVELT DAM

As designed, Roosevelt Dam was a massive structure—200 feet by 180 feet at the base and tapering up 270 feet between the canyon walls to a 16-foot-wide crest, with a slight upstream bow.¹⁰ The areas on either end of the dam that previously served as quarries became the spillways, permitting an estimated 220,000 cubic feet per second (cfs) of floodwater to pass around the dam when the lake was full.¹¹ As later events would prove, this tremendous capacity was necessary to preserve the dam when the Salt River and Tonto Creek flooded. Engineers built a road across the crest of the dam, with bridges over the spillways on both ends.¹²

Construction had barely begun when a rapidly rising river flooded the dam site late in 1905. After years of drought, this flood marked the first of many that slowed progress toward the dam's completion. At times, floodwaters wiped out months of work while essential equipment and supplies washed away.¹³

The dam's foundation stood on bedrock, which in some places was nearly forty feet below the riverbed. Workers laid the first quarried stone (weighing six tons) in September 1906. The stones on the upstream and downstream faces were dressed, or squared off, and placed with precision. Large irregular stones weighing up to ten tons each filled the vast bulk of the dam between these two faces, each carried from the quarry areas to the dam by one of the two long cableways stretched across the canyon. Smaller rocks filled the horizontal gaps between the large stones, while concrete filled the vertical spaces. The interior boulders were placed carefully to avoid continuous joints or faults. After drying into a solid mass, each step became the foundation for the next level.¹⁴ Despite the persistent flooding and equipment failures, by 1908, as the dam grew vertically, construction processes were well-honed and the work at Roosevelt continued nearly nonstop. The workforce was small but efficient and construction contractor J. M. O'Rourke's workforce consisted of around 220 men in 1908.¹⁵

Strings of suspended electric lights allowed crews to labor through the night. The most intensive work was in the quarry, where the stones for the dam were mined during the day and at night were delivered to the worksite via the cableways. This freed up the cableways during the day for the delivery of wet mortar and concrete to the crew placing the stones. A lake began to form behind the dam, and in the summer of 1908, for the first time, a limited amount of stored water was available for irrigation in the Valley.¹⁶

WORK AND LIFE AT ROOSEVELT

As workers congregated in the area, the town of Roosevelt formed in a low-lying area just above the dam site. By 1908, the waters backing up behind the rising dam inundated the town and it had to relocate to higher ground. The USRS set up offices and living quarters on Government Hill several hundred feet upslope from the main part of town, while O'Rourke's crew camped on the opposite bank.¹⁷ At the height of construction, more than 2,000 people

lived in the town and outlying camps, making the area one of the largest settlements in the Arizona Territory.¹⁸

With periodic floods suspending construction, workers often had to leave to find other employment. Coupled with the isolation of Roosevelt, the difficult and dangerous work, and the relatively low wages, the project suffered from episodic labor shortages. Advertisements for both O'Rourke's contracting firm and the USRS spanned the country to recruit laborers and groups of specialized workers, such as Italian stonemasons from Pennsylvania and New York.¹⁹

The town of Roosevelt, Government Hill camp, and O'Rourke's camp were multicultural communities with significant numbers of white, black, Mexican-American, and Native American workers.²⁰ Despite being a rough and temporary community, Roosevelt had a surprising number of amenities. It boasted a post office, restaurants, a hotel, churches, a bakery and butcher shop, laundries, a grocer and dry-goods store, an ice cream parlor, an optometrist, and a photographer.²¹ Entire families moved to the area, and by 1905, 100 children attended Roosevelt School.²²

In their spare time, residents enjoyed a bowling alley, dancing school, and nearby hot springs.²³ The men's baseball teams and a women's basketball team competed in regional leagues, and for a time there was even a grass tennis court. Balls, dances, and holiday fiestas occurred regularly, as did musical performances by local artists.²⁴ In November 1905, a touring company staged a two-night run of the play *Miss Hursey from Jersey*.²⁵ Life at Roosevelt Dam reflected the diverse population of people working on the dam, and the town evolved into a meaningful community as construction progressed.

FROM GRANITE REEF TO THE VALLEY

The Salt River Project included much more than Roosevelt Dam. The USRS and the Association undertook numerous other efforts in the Valley, including unifying the vast network of irrigation works into an area-wide water transmission and delivery system, securing the water rights of Valley lands, and developing a power delivery infrastructure capable of serving growing electricity needs.

For the most efficient operation, USRS engineers and Association leaders believed that SRP should own and control the entire Valley irrigation system, including a permanent diversion dam at Granite Reef just below the confluence of the Salt and Verde Rivers. The second dam would serve as the diversion point for delivery systems on the north and south sides of the river. The 1905 flood tore out parts of an existing takeout structure and headgate feeding the



Dining hall in the town of Roosevelt, February 1906



Buildings used during the construction of Roosevelt Dam, like the Apache Lodge, were repurposed after the dam's completion. The Apache Lodge served as a hotel for tourists to the area.



Granite Reef Diversion
Dam and westside intake
gates, 1911

Arizona Canal, a fatal blow to the Arizona Water Company, owner of all the Arizona Canal features and the rest of the northside canals. While northside landowners faced difficulty in maintaining their water supply, the Association and the USRS convened a board of engineers to appraise the assets of the struggling company. The board recommended that the federal government acquire the canal system north of the Salt River. A supplemental contract between the US government and SRVWUA, signed in March 1906, authorized this purchase and the incorporation of the northside canals as part of the project. The contract also solidified a

commitment by the USRS to build a permanent concrete diversion dam. The northside irrigation system purchase included two hydropower plants on the canals, originally owned by the Phoenix Light and Fuel Company (PL&FC). Rather than be obliged to run canal water to power the plants, the USRS agreed to supply the company with power from Roosevelt Dam.²⁶

Construction of the 1,100-foot-long Granite Reef Diversion Dam began later the same year. Firmly anchored in bedrock and rising fifteen feet above the riverbed, the dam diverted the river flow into the Arizona Canal, which would carry water to the northside canal system and the new South Canal to feed the entire southside system. The curved design of the dam allowed floods to pass over it easily with minimal damage to the structure. On its completion in 1908, the dam changed the Salt River bed through the Valley from an intermittent desert stream to a dry riverbed. Granite Reef could fully divert the river flow under normal flow conditions. As a result, a small, attractive lake, dubbed Lake Martin (after the superintendent of construction), formed behind the dam, making it a popular recreation destination.²⁷ On June 13, 1908, Granite Reef's official dedication took place, presided over by Governor Joseph H. Kibbey. The *Arizona Republican* proclaimed that "from this day forward, there will be no chance for the water to shirk its duty or dodge a confiding and trustful public. We will have what we have got, and it can't get away."²⁸

By 1910, the government had acquired and developed much of the southside irrigation system, including the purchase of the Consolidated Canal and construction of the Eastern Canal, which replaced the Highland Canal.²⁹ The farmer-owners of the Mesa Canal Company, who had previously declined to join the Association, sold their canal to the government and filed for membership in the Association.³⁰ Louis C. Hill, Supervising Engineer of Roosevelt Dam construction, tried to persuade the Tempe Canal Company to do the same, in part because



Governor Kibbey speaking on Dedication Day at Granite Reef Diversion Dam, June 13, 1908

the Tempe lands essentially cut off access to 6,000 acres of SRP land south of Phoenix. When the Tempe landowners again voted not to join the Water Users' Association, the south Phoenix landowners raised the money to build the Western Canal, which connected to feeder ditches from the Consolidated Canal.³¹

A. J. Chandler's Consolidated Canal had never delivered much water, because the Chandler lands had such low-priority water rights. Less than a quarter of the land in the development was irrigated before the government bought the canal in 1908. The USRS purchased the little-used canal for \$187,000, mainly because it would have been much more expensive to replace the upper section of the canal, which "climbed" from the riverbed up to the southside mesa. Although the purchase price merely reimbursed Chandler and his associates for the cost of the canal, the sale was worth much more to them as it ensured that their lands were able to receive water stored by the new dam. They had purchased much of their land for as little as \$1.25 an acre in the 1890s. By 1915, the USRS would estimate that the market price of the Chandler Ranch land was \$85 per acre.³²

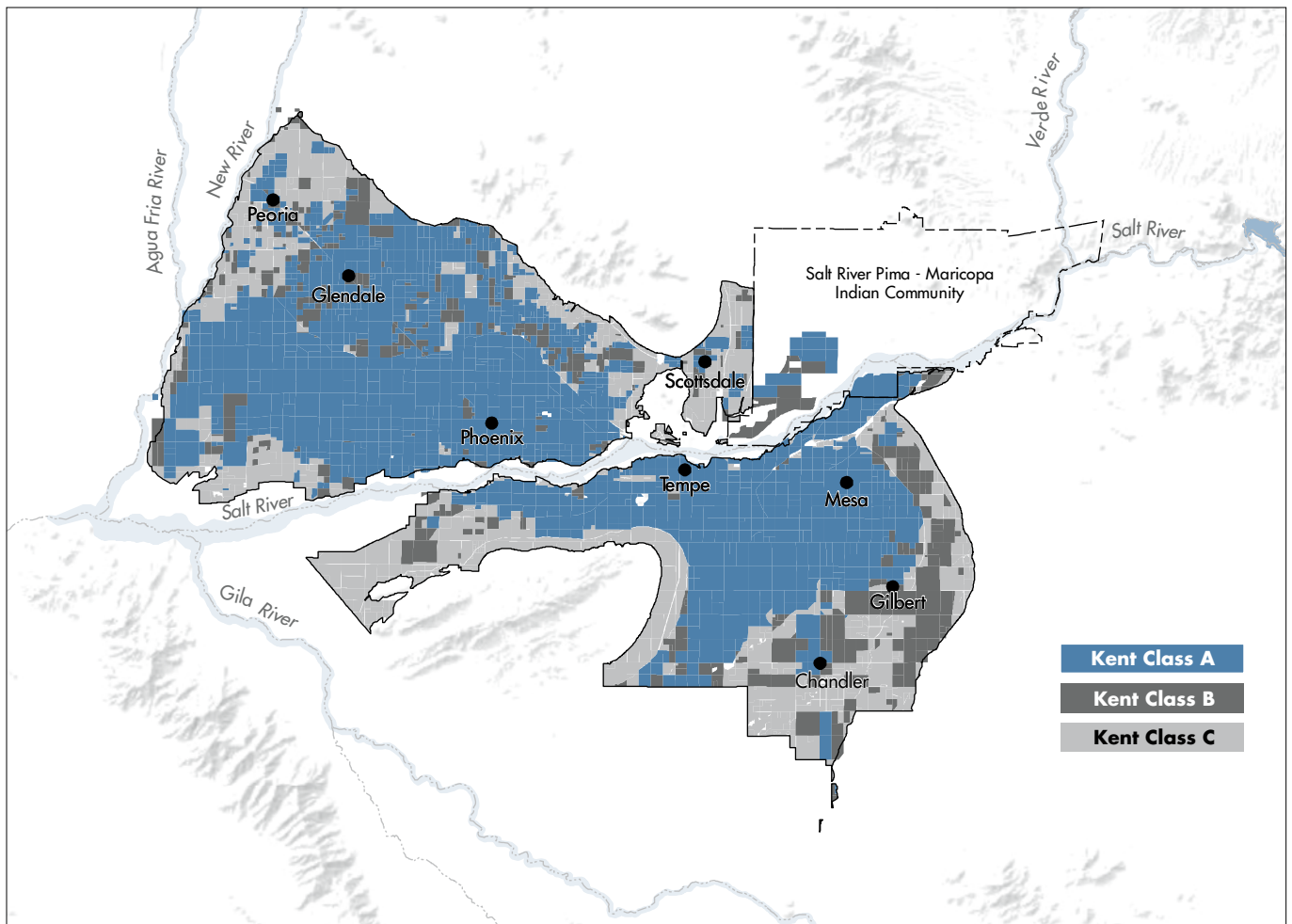
DETERMINING WATER RIGHTS

In 1904, at the urging of the federal government, the Association had initiated a friendly lawsuit, *Patrick T. Hurley v. Charles F. Abbott et al.*, to establish once and for all the water rights of every section of farmland in the Valley.³³ At first, some questioned the need for a suit, partly because of concern that drawing attention to the tenuousness of water rights in the newer developed areas might hurt land sales. However, once the federal government entered the suit as a cross-complainant on behalf of the Indians of the Salt River and Fort McDowell Reservations, it became clear that the case would be prosecuted to its conclusion.

In March 1910, Judge Edward Kent issued his opinion, called the Kent Decree.³⁴ The Kent Decree defined the three classes of water that would be available to Valley lands: normal flow, floodwater, and water that would be stored behind the dam. It also divided the lands of the Valley into three classes with corresponding priorities for water rights. Class A lands were those that had been more or less continuously cultivated since first irrigated. Class B lands had been irrigated in the past but not after 1903. These were largely lands with low-priority rights that were left without water during the drought of 1897–1904. Class C lands were those with no history of irrigation. Under these definitions, the Valley contained 151,000 acres of Class A land and 29,000 acres of Class B land. Kent also determined water allocations to the Salt River and Fort McDowell Reservations and gave them the highest priority. His decision upheld the principles of prior appropriation, appurtenance, and beneficial use, established in the 1892 Kibbey Decree in *Wormser v. Salt River Valley Canal*.³⁵

The Kent Decree provided the necessary legal complement to the professionally engineered irrigation system under construction at the same time. Combined with improved

Kent Decree lands, 1910



data on water supply and use, the Kent Decree made possible the determination of the number of acres Roosevelt Dam could support. Equally important, by formalizing the water claims of Valley lands, the decree essentially reserved the water of the Salt and Verde Rivers for the Valley. Kent's decision was enduring—SRP continues to deliver water to its shareholders according to the Kent Decree.

THE POWER SYSTEM

While SRP water development advanced, the production and delivery of power emerged as another key component of western reclamation projects. While the 1902 Reclamation Act made no explicit provision for hydropower generation, by 1906, an addendum to the law, the Townsite Act, allowed reclamation projects to provide water to nearby towns, formalized the utilization of generated power for project uses, such as groundwater pumping, and allowed excess power to be sold as a revenue stream to underwrite costs. USRS engineers working on Roosevelt Dam planned a powerhouse to fully utilize the generating capacity of the dam. In addition to the power canal, which would continue to provide power for generation, the penstock through the dam carried irrigation water releases to the powerhouse for even more hydropower production. In July 1909, workers completed a transmission line from Roosevelt Dam to Mesa and Phoenix. Regular transmission to Phoenix and Mesa began in September of that same year.³⁶

The Roosevelt hydropower station was by far the largest in Arizona with great potential for revenue. Pacific Gas and Electric Company (PG&E, no relation to the California utility) purchased the majority of the power wholesale at a rate of 1.5¢ per kilowatt-hour (kWh). PG&E was the successor of the Phoenix Light & Fuel Company and had inherited a franchise to serve Phoenix. The contract with the USRS was for ten years of Roosevelt power.³⁷ Other early power contracts generally went to large users, including other area towns, the Consolidated Canal Company, and Southwestern Sugar and Land Company in Glendale.³⁸ Early contracts required customers to provide their own transformer and line from the two main SRP lines in the Valley.³⁹



Transmission tower along the Apache Trail, 1909

By 1908, the USRS had received queries from the copper mining industry around Globe about purchasing power. The Association board passed a resolution that all power developed by the project beyond that needed for SRP purposes should be sold on the best possible terms, “having due regard always for the best advantage that may accrue to this association and to the people of this valley.”⁴⁰ This was perhaps the first statement on the benefits of SRP's development

of the Valley through electric power generation. Through a 1912 contract, the Inspiration Consolidated Copper Company of Miami became by far the largest single consumer of SRP power and it would remain so for most of the twentieth century.⁴¹ The Inspiration contract proved crucial to the financial stability of SRP and laid a foundation for the future of its power business.

Association leaders were also well aware of the potential for hydroelectric generation on the SRP canals. Existing hydropower plants at Arizona Falls, on the Arizona Canal, and Chandler Falls, on the Tempe Canal, had proved that drops as small as eighteen feet could generate significant amounts of power. By 1910, however, it was apparent that the USRS had no funds available for additions to SRP, no matter how profitable they might be. Nevertheless, the Association pressed on with plans for additional hydrogeneration facilities. It assessed each member acre \$2 per year for two years and estimated that power sales from the stations would return the members' investment within two years of completion.⁴²



Crosscut Hydropower
Plant under construction,
circa 1913

USRS engineers designed and directed the construction of three new hydropower plants, one replacing the Arizona Falls plant, one on the South Canal at its junction with the Consolidated Canal, and a third much larger hydropower station in Papago Park near the headworks of the Grand Canal.⁴³ When completed in 1915, the three Valley facilities almost doubled the power generating capacity of Roosevelt.⁴⁴ The Association's willingness to finance improvements to a federal project established a precedent that would resonate throughout SRP's history.

DEDICATION OF ROOSEVELT DAM

The major work on Roosevelt Dam was finished in 1910. By summer's end, the workforce had scattered and much of the equipment was taken down and sold. Final touches included the completion of bridges and parapets for the road across the dam.⁴⁵ A record 131,000 acres was irrigated in the Valley in 1910.⁴⁶

It would have been possible to dedicate the dam in the fall of 1910, but in hopes of a full reservoir, the planning committee decided to wait until the following spring. Permanent lighted globes were installed on the dam's parapets, partly to create an impressive display for the ceremony. Organizers invited former President Roosevelt to preside over the ceremony and based on his schedule selected March 18, 1911, as the dedication date. Roosevelt's private railroad car arrived in Phoenix before ten o'clock that morning, and an official caravan of

more than twenty automobiles, with Roosevelt's in the lead, immediately left for a tour across the Valley and east to the new dam. In his speech that afternoon, delivered on the top of the monumental new structure, the former president cited western reclamation and the Panama Canal as two of the greatest accomplishments of his administration. Though not yet half full, the reservoir contained more than 500,000 acre-feet of water. Supervising Engineer Hill remarked, "The water in the reservoir is creeping up a few inches every day and every inch now means a good many acre-feet [for the Valley]."⁴⁷

SRP was considered a model project from the beginning due to the Valley's ideal climate, layout, and soil, and because its residents already had the resources, experience, and ambition necessary for success. The Phoenix Board of Trade released a report which concluded that a storage dam would lead to 500,000 people living and working on Valley farms and another 500,000 settling in Valley towns: "The proposition . . . is in no sense visionary. The site for a large and ample reservoir is a fact."⁴⁸ The US government made a huge investment in the Valley with its construction of SRP and did not have to wait long to see positive results. Within a few years of the dedication of Roosevelt Dam in 1911, the Valley doubled its farmed acreage and quadrupled the value of its crops. Within ten months, Phoenix was the capital of the new state of Arizona.

The construction of Roosevelt Dam and other works created a new sense of optimism and prosperity. The USRS showcased its prize project to a steady stream of politicians, engineers, and journalists, generating a great deal of free publicity for the region. The project brought to the Valley large numbers of engineers who contributed their expertise not only to the irrigation project but also to agriculture, infrastructure, and industry. They investigated groundwater resources and soil conditions, developed profitable new varieties of crops, and engineered roads and bridges.⁴⁹

The Phoenix Board of Trade joined with the Santa Fe and Southern Pacific Railroads to promote the Valley nationally, and other trade organizations followed suit. They marketed a profitable, pastoral region that would support a good life for families.

A 1908 article in *National Geographic* devoted to homemaking on western reclamation projects was effusive in its description of SRP and echoed the theme of easy living: "There are no farmhouses on the farms. The farmer lives in town and goes to and from his small farm each day. Here at last the farmer's wife has her innings. She has the society of her neighbors; her children have graded schools; the church and library are at hand. There is no isolation, no loneliness."⁵⁰ Such descriptions attracted national attention. By 1908, the USRS was receiving a thousand inquiries a week about SRP from home seekers across the country.⁵¹

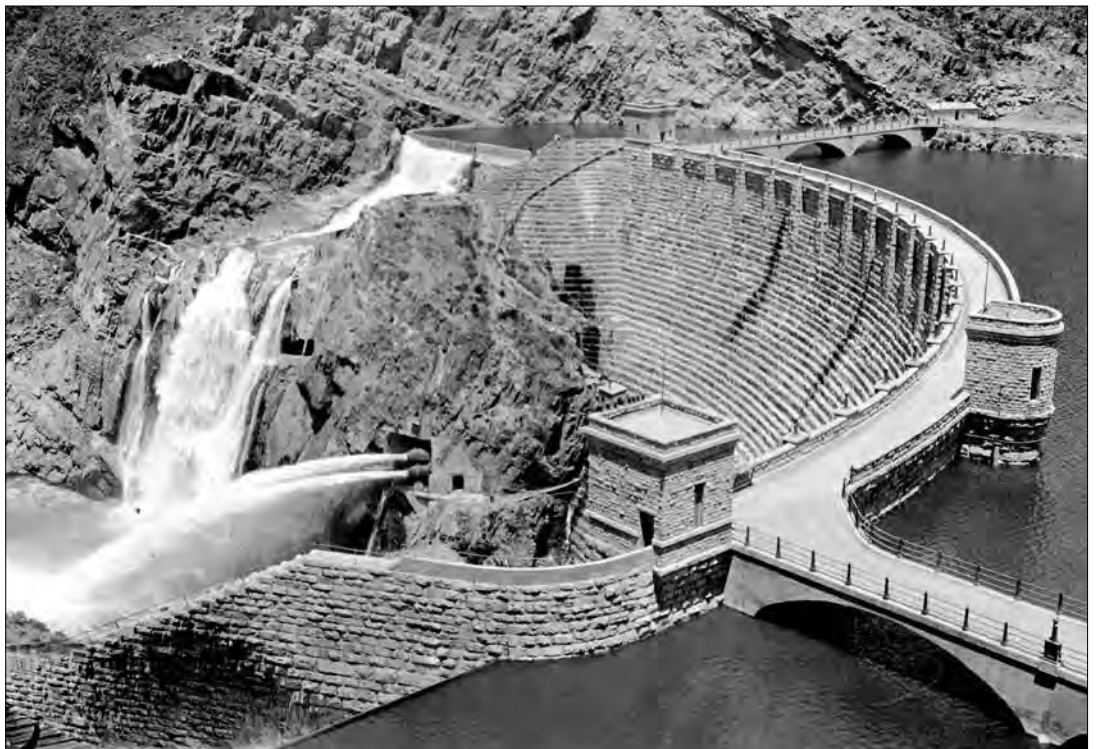
WATER OVER THE SPILLWAY

In the spring of 1915, Roosevelt Lake filled rapidly with spring runoff from winter snows despite the fact that 1,000 acre-feet of water per day was being released for irrigation. As the water level rose steadily, a rededication was planned to celebrate the first overflow of

the reservoir. “Nine Inches of Dry Concrete between Lake Level and Overflow Point” read a newspaper headline on the morning of April 14, and people from the Valley, Globe, and Miami left for the dam.⁵² At 8:30 p.m., a trickle of water went over the spillway, some of which was captured by Project Engineer C. H. Fitch and placed in a copper flask. The flask of precious Arizona water was sent to New York, where it would be used to christen a new battleship, the *USS Arizona*.⁵³

The crowd at the dam on April 15 for the rededication ceremony was estimated at 3,000 people—twice the size of the crowd at the official dedication four years earlier. In the four years between the dedication and rededication ceremonies, Arizona became a state and SRP had manifestly proven itself. All the acreage under the project and the Tempe lands (whose owners had yet to join the Association) were receiving water. Speakers at the “Water Fête” praised the foresight of the project pioneers and marveled at how the improved irrigation had energized the Valley, contributing to a doubling of population and a sevenfold increase in the assessed property values in less than ten years.⁵⁴

Water flowing
over spillways at
Roosevelt, 1916





CHAPTER FOUR:

THE WATER USERS

As the physical infrastructure of the Salt River Project neared completion, the USRS and local water users debated the methods of managing the final irrigation system and how to distribute the project's costs. This discussion, contentious at times, lasted for six years following the completion of Roosevelt Dam, resulting in a contract that defined the terms of the relationship between the SRVWUA and the United States as well as the nature of federal interest in a local entity.

Following the negotiation of the Association's contract with the United States, the Association took over the management of the Salt River Project. In its early years, the organization faced economic hardships, implemented organizational improvements, and elected new leadership. The Association partnered with other groups to address challenges and continued its commitment to protecting the water rights of its shareholders.

REPAYMENT CONCERNS

As the USRS took on the monumental task of building reclamation projects all over the West, it faced numerous challenges with the communities it served. Many local farmers complained that the federal entity was unresponsive to their concerns. Tension mounted as water users groups and irrigation districts throughout the West pressured the Secretary of the Interior and Congress to amend the Reclamation Act or modify the policies of the USRS, particularly as it related to financial matters.

The initial mechanism for funding federal reclamation projects began to show signs of trouble. Originally, project funds were supposed to derive from

sales of public land, allocated according to the value of land sales in each state or territory—those areas that raised the most money would receive the most investment. However, this formula proved inadequate as the bulk of reclamation funds went toward more expensive items like water storage, pump, and transmission facilities to serve lands already under irrigation rather than raw desert. Land sales did not cover the increasing cost of reclamation projects.¹ The ultimate responsibility for payment fell to the water users who would benefit from the improvements and, as soon became clear, the financial burden was significant. The questions over the terms of repayment of the government loans concerned a wide range of participants, including the landowners and leadership of the various reclamation projects, the USRS, and the US Congress.

SRP water users joined with their counterparts on other reclamation projects in seeking alternative options for addressing project costs, which had grown substantially from initial estimates. As a showcase project for the USRS, the Salt River Project received substantial funding. The first estimates for the project came in at \$3.75 million.² However, by 1909, project development had grown to more than double the original cost estimates due to the improved design for larger reservoir capacity; the construction of a power canal, hydropower station, and Granite Reef Diversion Dam; the purchase and renovation of Valley water delivery systems; and rising labor costs.³ The Water Users' Association and the community at large had supported the addition of new power facilities and water infrastructure, but as the time approached to begin paying the government back, farmers expressed doubts about their ability to afford the assessments.

While they originally expected to pay around \$20 an acre, farmers now faced estimated assessments of more than double that amount, as much as \$7,000 on a 160-acre farm at a time when a few thousand dollars a year was considered a good annual income.⁴ In addition to the construction repayment, farmers would be charged an annual assessment for operations and maintenance—the cost of delivering the water. Many landowners, particularly recent arrivals in the Valley, were also making loan and mortgage payments on their land, homes, and equipment, as well as paying taxes.

In 1909, the Senate, sufficiently concerned about the status of western reclamation, sent its Committee on Irrigation and Reclamation of Arid Lands on an inspection tour of almost every western project. A public hearing before the committee in Phoenix revealed that although SRVWUA leadership and membership as a whole supported the work of the USRS and endorsed plans for additions to the project, some Association members felt that the repayment term should be extended.⁵ In fact, many farmers across the West advocated extending the repayment term from ten to twenty years. The USRS opposed any extension, a stance which supported the long-term viability of western reclamation but showed little sympathy for the realities of regional farm economics. The committee's final report proposed no substantial changes in either the law or the USRS administration. It recommended that the repayment

period not be extended and that the water users repay the full cost of each project, as spelled out in the original agreements.⁶

The concerns of Salt River Valley farmers were not unique, but rather part of a growing chorus of public and political calls for the USRS to demonstrate more flexibility, show consideration for local conditions, and focus on local decision-making.⁷ In the Salt River Valley, the Board of Governors of the Association initially avoided pushing this issue, fearing that a strong stand might endanger the funding necessary to complete construction. However, by 1912, project costs had climbed to \$10.5 million, and pressure from the Association's membership moved the board to support an extension of the repayment period.⁸

With repayment issues looming large for members of the Association, concerns also emerged over operating costs. In 1909, some shareholders circulated a petition demanding the resignation of Association President Benjamin A. Fowler and legal counsel Joseph Kibbey, the principal issue being their salaries of \$2,000 per year.⁹ Another source of controversy was the so-called Water Temple, a proposed office building for the Association in downtown Phoenix, which was financed by assessing Association members. A segment of the farm population considered the building unnecessary. This faction even enjoyed some support from SRVWUA's elected leadership.¹⁰

Local newspapers reported that a number of Association members were backing a new candidate for president in the biennial election scheduled for April 1910: John P. Orme. Orme had been a board member since 1904 and also served on the Maricopa County Board of Supervisors. His campaign supporters declared that he stood for "the small farmer against the speculator."¹¹ Like Fowler, Orme supported the Water Temple, but he proposed that Association membership vote on the matter. Once it became clear that Orme had considerable support and a strong desire for the office, Fowler declined to run for a fourth term as president.¹² Orme won the election and served as Association president until 1918. The Water Temple assessment also passed.¹³

After the election of President Woodrow Wilson in 1912, the new Secretary of the Interior, Franklin K. Lane, faced immediate pressure to resolve the reclamation controversies. He noted, "Ever since I came here, senators and congressmen have been overwhelming me with curses upon the Reclamation Service."¹⁴ Lane immediately initiated changes to increase the power of water users while adhering to the principles of the Reclamation Act. With his support, the Reclamation Extension Act passed Congress in 1914, increasing the repayment term for reclamation projects to twenty years. Lane also replaced USRS Director Frederick Newell with Arthur P. Davis.

Lane's primary method of resolving disputes was to establish independent boards of review consisting of members of the USRS, the water users associations, and outside engineers. He convened two such boards to resolve the outstanding points of contention regarding SRP: the final delineation of the lands to be included in the project and the project's

cost. The group charged with deciding land issues, called the Board of Survey, primarily followed the water rights principles established in the Kent Decree mitigated by practical consideration of water delivery issues, the 160-acre limit on farm size under the reclamation law, and the history of cultivation.

In its final report, approved by Lane in November 1914, the Board of Survey found that of the more than 230,000 acres of irrigable land within the project's boundaries, the maximum available water supply would serve approximately 195,000 acres. These findings necessitated a reduction of almost 40,000 acres, including many lands previously subscribed in the Association. Most of the excluded lands were on the fringes of the project area and had not been irrigated prior to Roosevelt Dam's construction. To lessen the outcry of those landowners whose lands were wholly or partly excluded, the Board of Survey urged additional groundwater pumping and the damming of the Verde River to increase the amount of water in storage.¹⁵ In fact, most of the affected landowners were able to purchase surplus water from SRP to continue irrigating their acreages, and when new water supplies became available in the 1920s, they joined the SRVWUA as project lands.

Resolving the final costs for the project took time and negotiation. The initial board was divided and resolved that the proper cost of the Salt River Project—that is, the total cost minus deductions for mistakes and inefficiencies—was \$7.2 million. The Department of the Interior overturned this finding and held that the value of the works created and the difficulties of the project justified the total cost with no more than a nominal reduction for overhead. After considerable negotiation both within the DOI and between the Association and Washington, DC, the cost was fixed at a little more than \$10 million, slightly less than \$60 per acre.¹⁶

THE 1917 CONTRACT

Despite the intent of the Reclamation Act, by 1917 few local entities had taken over control of reclamation projects. For SRP, the Association was poised to take over operation—construction was complete, the lands to receive irrigation designated, and the farmers were prosperous. Several contentious issues remained, however. First, the Water Users' Association sought to have the cost of the Roosevelt power canal removed from the project repayment because it had proven extremely difficult to maintain and only marginally useful for power generation.¹⁷ Second, the Association wanted to delay the start of payments for seven years while it built a dam on the Verde River. This dam would allow the “dry-landers” (those Association subscribers denied SRP water by the 1914 Board of Survey) to be included in the project and protect SRP claims to Verde water. Lastly, and perhaps most importantly, the Association wanted to keep the revenues from selling power generated by the project.

The costs of the Roosevelt power plant and transmission system were included in the Association's repayment obligation, and Association shareholders had already bonded

themselves to pay for hydropower plants along Valley canals, which they deeded to the government. A USRS study estimated that the SRP power plants were producing \$30,000 a month above operating expenses, and Association President Orme and the Board of Governors wanted to apply this revenue to offset project expenses.¹⁸ Many of these leaders evidently remembered the years before the USRS arrived, when lack of financial resources as much as lack of water threatened the Valley's prosperity and continued growth.

USRS Director Davis opposed these requests because they would either reduce or delay payments from the Association into the reclamation fund. In February 1917, Orme and legal counsel Kibbey went to Washington to discuss these issues with Arizona Congressman Carl Hayden, Interior Secretary Lane, and Director Davis. Hayden took the position that the Association shareholders had agreed to finance the canal power plants only because of a tacit agreement with the USRS that the power revenues would be applied to offset Association costs. Davis countered that the Association had already enjoyed six years of benefit from Roosevelt Dam and the power system without having paid a penny of either principal or interest and that this benefit was all they were entitled to. After considerable discussion, as reported by Davis, Lane made a proposal:

The Secretary then announced to the Arizona delegation that he was anxious to get rid of the project, and if they would enter into a contract to take care of all future expenditures and to return the entire cost of the project . . . he would turn over the entire project to them and they might apply all the power receipts in any way they saw fit. He asked Judge Kibbey if he thought the water users would approve such a contract. Judge Kibbey expressed doubt, but after considerable discussion, both Judge Kibbey and Mr. Orme agreed that such a contract might be approved by the water users and would be put up to them if approved by the Secretary.¹⁹

Hayden was prescient in understanding that the Association's ability to keep power revenues was much more important than the other issues. Orme and Kibbey had come to the meeting principally seeking to resolve the issues of the power canal cost and the delay in payments, which were the primary concerns of Association shareholders. After some thought, however, they apparently realized that this was an offer they could not afford to refuse. Davis was furious and peppered Lane for months with complaints about what he saw as the illegality, foolhardiness, and even immorality of turning the power revenues over to the Association, but Lane never swayed.²⁰ This provision of the 1917 contract was essential in shaping SRP into the regional power entity it is today.

Over the next several months, government and Association officials worked out the details of the contract. In August 1917, shareholders voted to ratify the contract by a tally of 49,024 acres to 3,145.²¹ Some DOI officials questioned the validity of the vote on the basis that only a

minority of the roughly 180,000 possible votes were cast. Association leaders assured Secretary Lane, however, that the low turnout reflected nothing more than satisfaction with the terms.²² The Association—which had been acting as a client, adviser, and liaison to the USRS since its founding in 1903—took over management and responsibility for the operation of SRP on November 1, 1917.²³

The terms of the agreement, though hard fought, were simple and straightforward. The agreement represented the collective experience and wisdom of the engineers, farmers, lawyers, and politicians with stakes in the project. In accordance with reclamation law, the contract specified that the federal government retained title to project dams, canals, and hydropower plants, and that the Salt River Project remained a federal reclamation project. The Association became financially independent of the government and assumed the responsibility for carrying out and paying for ongoing operation and maintenance as well as any further improvements. The control of federally owned dams, canals, and rights-of-way by a local, financially independent organization was the most important statement to date of the public-private nature of SRP. This legal status conferred both strengths and burdens. SRP enjoyed some of the privileges of a federal agency, such as freedom from most state taxes, yet was also able to operate as a private corporation in business aspects of the company, financing power plants, and generating revenue, and it never had direct access to federal appropriations. Furthermore, all revenues went toward the power and water systems; the Association could not pay dividends to its shareholders, because the project benefits accrue to the SRP lands, not their owners. Moreover, the generation of low-cost power and the provision of a reliable water supply promoted economic development that advanced the entire Valley, not just Association members. The 1917 contract between the United States and the Association marked a crucial milestone for the project and continues to govern SRP's relationship with the federal government. The transfer of operations from the USRS to a local entity also represented an important moment for federal reclamation in the West.

OPERATING THE PROJECT LOCALLY

When it took over the operation of the project, the Association solidified its position as one of the most important organizations in the Valley. For the next thirty years, SRVWUA played a large role in the daily affairs of area residents as the leading supplier of irrigation water and wholesale power. The Association emerged as virtually the only organization in the state that maintained a relationship with the federal government in Washington. It also took on the responsibility of ensuring repayment to the reclamation fund, sending the first payment of \$132,000 to Washington in December 1917.²⁴

When the Association took over operation of SRP from the government, most of the USRS employees transferred to other projects, went into private business, or joined the military. W. R. Elliott was appointed the Association's first general superintendent and chief engineer.

Though John Orme was Association president when the transfer took place, he declined to run for another term. In April 1918, Association voters elected longtime board member Frank M. Wilkinson to the post.²⁵

During the Association's first several years of managing SRP, its primary responsibilities were the delivery of water and the maintenance of the canal and ditch system. The entire irrigated area was organized into forty-five divisions, each under the control of an Association *zanjero*.²⁶ Under the Association system, the *zanjeros* took irrigation orders from each farmer and phoned the orders in to a watermaster. The watermasters then aggregated the orders and opened the gates at Granite Reef to release water from the system of dams and reservoirs upriver into the canals. The *zanjeros* operated the gates and check structures on the canals and laterals to deliver the water to member lands. Once ordered, water usually arrived in about three days.²⁷

Nine work crews, made up of about a dozen men each, carried out the maintenance for the irrigation system. Because of the large area, the rural nature of most of the Valley, and the dependence on horses and mules for many jobs, the maintenance crews lived in roving units, camping at night along canals and roads. The Northside Camp, at 12th Street and the Grand Canal, and the Southside Camp, at Alma School Road and the Western Canal, marked the crews' headquarters where supplies and food were prepared for delivery to the mobile camps. The crews' work consisted mostly of cleaning and weeding waterways. In 1922, Construction and Maintenance Foreman Lee Webb was instrumental in bringing a large group of Yaqui Indians from Mexico to work on the maintenance crews. Because the Yaqui arrived as an entire community, the Association provided them with permanent, if basic, housing. These Yaqui communities supplied the majority of SRP irrigation maintenance workers into the 1950s.²⁸



Zanjeros opened and closed gates like this one, circa 1900s, in order to deliver water.

THE SHAREHOLDERS SPEAK

After the Association took over management of SRP, a long-simmering difference of opinion concerning the mission of the organization became increasingly evident. One side in the dispute consisted mainly of established farmers who considered the delivery of water

to their farms at the lowest possible cost to be the primary function of SRP. Their opponents encouraged a broader purpose, as they envisioned Phoenix as a great city of the future built on industry, finance, and tourism, with farmlands spreading out from a much larger urban center.

Association President Wilkinson and General Superintendent Elliott exercised a practical business approach. Like their USRS predecessors, they understood that SRP's electric generation capacity was underutilized and undervalued, because power was generated only when water was released from Roosevelt Dam for irrigation. When it was running, Roosevelt Dam was the biggest power plant in Arizona, but when irrigation deliveries dropped to a trickle in the winter, the plant went offline. As a result, the Association could not offer firm or constant power to its customers and earned a fairly low rate. The solution, Wilkinson proposed, was to invest \$600,000 to build a steam generating plant that would take over when Roosevelt Dam was offline.²⁹

In September 1919, the Association board called an election to decide the issue. In the last few days before the election, a spirited and influential opposition to the power plant emerged, led by O. S. Stapley, a businessman closely tied to the farmers. This group saw the steam plant as a foolish venture with the main purpose of supplying "cheap power to the mines [that could] well afford to take care of themselves."³⁰ Wilkinson countered that the steam plant would provide the necessary standby power to meet existing contractual obligations and would enable the Association to charge more for all the power it sold.³¹ In the October 28 election, the measure was soundly defeated.³²

As expected, Wilkinson ran for re-election in April 1920. Shortly before the election, Francis A. Reid, a Valley newcomer, announced his candidacy.³³ The election saw little public debate, but Reid published a letter to the editor and a large advertisement in the *Arizona Gazette* charging the incumbent administration with "mismanagement and extravagance" that he argued would inevitably lead to higher shareholder assessments.³⁴ On his promise of efficiency and reform, Reid easily won the election. One editorial writer referred to him as "a businessman of rare acumen, an executive of unusual power and genius," who would conquer the difficulties of leading the Water Users' Association.³⁵

On the day prior to the election, Elliott announced his resignation, effective at the beginning of the new fiscal year, May 1, 1920.³⁶ Charles C. Cragin, an accomplished engineer with strong credentials, replaced Elliott. Cragin was new to the Valley but not to the West. He brought with him a high degree of engineering aptitude and considerable experience with western development. Reid and Cragin formed one of the most dynamic teams that ever led SRP, and they epitomized the booster philosophy of Valley leaders in the 1920s.

POSTWAR PROBLEMS

General Superintendent Cragin's first charge was to reorganize the workforce and cut operating costs. His efforts resulted in widespread efficiencies and cost savings. Early changes under Cragin's leadership included improved water delivery and accounting protocols,

coordination between the irrigation and power departments, and trimming staff and raising salaries while simultaneously improving production.³⁷ Trucks replaced mule-drawn wagons, saving time and money. Telephone connections between the most important river gauging stations at Granite Reef Diversion and Roosevelt Dams enabled operators to better coordinate Salt River releases with the flow of the undammed Verde River. As a result of these changes, operating costs dropped significantly in the first full year of the Reid administration.³⁸

These savings were fortunate as the booming wartime economy came to a dead stop in late 1920 and prices of agricultural goods plummeted below prewar levels. Valley farmers were especially desperate. They had planted record acreages in cotton, not anticipating that the cotton market would go from shortage to surplus at the end of the First World War. Enthusiasm had been so high that alfalfa fields were plowed up and dairy cattle were slaughtered to make more room for cotton. Land prices had soared during the boom leaving banks and sellers carrying hefty mortgages.³⁹ It was estimated that the loss on cotton in 1920 was equal to the cost of constructing Roosevelt Dam and the Valley canals.⁴⁰ Local banks and cotton gins lent \$14 million to farmers trying to hold on, but a wave of farm foreclosures spread. The Valley Bank, for example, ended up owning 40,000 acres of farmland.⁴¹

These economic issues had an immediate impact on the Association's ability to meet its obligations to the government. In 1920 and 1921, delinquencies on assessment payments rose sharply. The Association requested, and received, several deferments from the DOI. However, when President Reid requested yet another extension in December 1922, the USRS protested to the Secretary of the Interior that the Association was earning enough in power revenues alone to make its payments.⁴³ Reid countered that the power revenues were necessary for the operation and maintenance of the project and that drainage work and flood damage repairs represented immediate needs.⁴⁴ The Association and the USRS reached an agreement in July 1922 on a repayment schedule that assigned power revenues directly to the arrearage until payments caught up.⁴⁵ Though Association farmers were beginning to pull out of the postwar depression, reclamation projects across the West shared their financial challenges. Between 1923 and 1926, the DOI and Congress responded with studies and legislation that ultimately extended the repayment period on existing reclamation projects from twenty to forty years.⁴⁶

Cotton field in the Salt River Valley, circa 1910s



Wartime Cotton

In 1901, the US Department of Agriculture began experimenting with the cultivation of Egyptian long-staple cotton on the Pima Indian Reservation. The longer and stronger fibers of the newly developed "Pima cotton" made it more suitable for industrial applications, including use as reinforcing cord for rubber tires before the invention of steel-belted radials. In 1916, the Goodyear Tire and Rubber Company began to purchase thousands of acres in the Valley for the cultivation of Pima cotton. The new plant thrived and became a major product in the local economy by the time World War I broke out in 1914. The ravages of war in Europe and the spread of boll weevils in the American South devastated traditional cotton-producing areas, and a booming market for cotton from Arizona soon emerged. Pima cotton was used during wartime in tire production, airplane wing fabric, aerial balloons, gas masks, and as a wool substitute for military uniforms.⁴²

DRAINAGE AND FLOOD CONTROL

The biggest problem facing the Association during its first several years of management was not water shortage but water surplus. Most of the Valley consists of alluvial soils up to several hundred feet deep, but in two places, underground rock formations rise very near to the surface. At the southwest end of the Valley, an underground ridge connects the Estrella and White Tank Mountains. In the middle of the Valley, another underground ridge extends from the east end of South Mountain to Papago Park and Camelback Mountain. Both of these ridges act as barriers to the movement of underground water, which flows slowly from east to west. As irrigated acreage increased and year-round irrigation became typical after 1910, the water table in the West Valley and Tempe rose to within a few feet of the surface, threatening to destroy not only crops through waterlogging but also the soil itself through a buildup of salts.

A February 1920 study commissioned by the Association described the threat: project-wide, the water table was rising 1.5 feet per year, and an estimated 43,000 acres had a water level ten feet or less below the surface. To alleviate the problem, the study recommended the installation of about thirty-three wells in order to remove 200,000 acre-feet of groundwater per year. However, the southwest area of the Valley had the most need for the wells, but this area is downgradient from the rest of the project, which limited the reuse of pumped water on SRP lands. Instead, the water would have to be pumped into ditches and carried to the river to be moved downstream.⁴⁷ In April 1920, the shareholders voted to assess themselves \$400,000 to install the pumps and dig drainage ditches.⁴⁸

Flooding remained another challenging problem. The most serious flood concerns occurred along the Arizona Canal, which crossed two major streams—Indian Bend Wash and Cave Creek. The original engineers, recognizing the potentially destructive force of floodwaters in these streambeds, built a flume to carry the canal over Indian Bend Wash. Cave Creek presented a more difficult problem. Whereas Indian Bend Wash followed a broadly defined channel all the way to the Salt River, Cave Creek, once it emerged from Moon Hills, diffused into a broad delta that spread from north Phoenix to Peoria.

After a series of destructive floods in the late teens and early 1920s, several contributors—mainly the City of Phoenix, Maricopa County, and the Association—established a fund to build Cave Creek Dam. Within days of its completion in March 1923, the dam intercepted a destructive flood, justifying the cost of building it almost immediately.⁴⁹

GROWING THE ASSOCIATION

Reid had campaigned for the Association presidency on a promise to apply modern business practices to SRP's operations, and it soon became clear that the organization's leadership was committed to the pro-development booster philosophy. Following recovery from the postwar depression, constant growth seemed to overcome every problem. Because of its well-established water rights and long-standing relationship with the federal government,

the Association exercised considerable power to promote the development of the Valley. Water was abundant for SRP lands, and its farms were profitable and worth much more than nearby lands that did not receive SRP water. The success of the project meant that more lands wanted to join. As discussed, the 1914 Board of Survey on SRP lands had concluded that there was an adequate water supply for a maximum of 195,000 acres and had therefore excluded 40,000 acres whose owners had joined the Association as early as 1904.⁵⁰ Because there was a need to maximize agricultural production during the war and the water supply was abundant (Roosevelt Lake filled in 1915, 1916, and 1917), the owners of these “dry lands” were able to buy water each year. A relatively dry year in 1918 might have led the Association Board of Governors to cancel this water sale, but the owners of 20,000 acres of dry lands successfully sued for full membership status in *Aldrich v. SRVWUA*.⁵¹

In May 1920, as its first act under newly elected President Reid, the board passed a resolution declaring that it was in the interest of the Association to bring into membership all lands within the project area that were being served by independent irrigation companies.⁵² The board reasoned that most of these lands had water rights and already were receiving the benefits of water storage without paying Association assessments. The largest area not yet in the Association was the Tempe Canal Company. When the aforementioned drainage issues threatened the Tempe area, landowners considered Association membership. The landowners in Tempe had a much smaller resource base available to deal with their drainage problem. In 1914, they dug a drainage ditch in an attempt to remove water by seepage. The ditch conveyed the water to the Gila River Indian Reservation for irrigation. This solution was only partially effective, and Tempe landowners looked to the Association for assistance.⁵³ Negotiations between SRP and Tempe began in 1919 but stalled over the issue of compensation for the infrastructure of the Tempe company. As drainage issues worsened in 1923, the two organizations finally agreed that the 24,000 acres of Tempe lands would join SRP on the same basis as previous canal companies. The owners of Tempe stock received a credit for their facilities and were required to pay all back assessments. In the next year, the Association drilled fourteen new wells in the Tempe area to drain waterlogged lands.⁵⁴

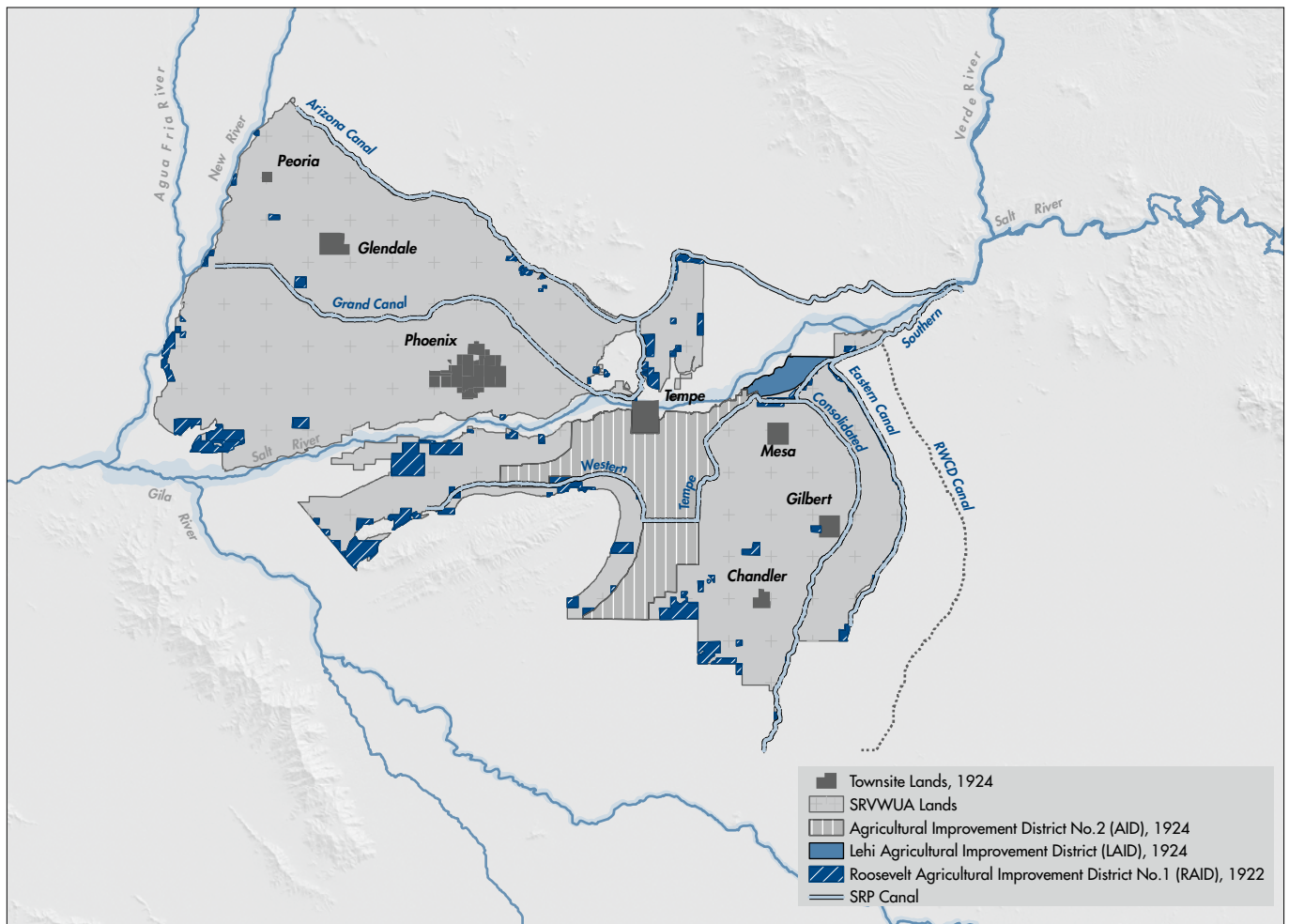
Most of the other excluded lands joined together as agricultural improvement districts following passage of enabling legislation in 1922.⁵⁵ The Roosevelt Agricultural Improvement District (RAID) consisted of approximately 10,000 acres scattered across the SRP area. By helping to finance Mormon Flat Dam (discussed in Chapter Five), the owners of these lands qualified for admission to the Association. Lands under the Utah Irrigating Ditch Company in the Lehi area of Mesa formed the Lehi Agricultural Improvement District (LAID). The Utah lands members had also declined membership in 1903, but LAID voted to join the Association in 1924. The DOI issued a public notice announcing inclusion of the Utah lands under SRP in 1928, bringing the total acreage of the project to more than 240,000 acres. With these additions, SRP’s water service territory was substantively determined.⁵⁶

ADJACENT IRRIGATION DISTRICTS

In 1920, the Association, with the consent of the United States, approved contracts with two irrigation districts attempting to form on SRP's borders. Both of these districts planned to acquire SRP drainage water and combine it with other resources to create a reliable water supply. The first contract was with the Carrick and Mangham Agua Fria Lands and Irrigation Company and concerned a 35,000-acre area west of the Agua Fria River.⁵⁷ The company proposed to take over operation and maintenance costs of SRP's drainage wells in the southwest area of the SRP lands and to convey the drainage water to its lands. They also planned to install new wells to assist in further drainage and buy the power for the wells from SRP.⁵⁸

Despite its contract with the Association and the demonstration of confidence by the Association leadership, the Carrick and Mangham Company was unable to sell the bonds needed to finance the work. In 1923, the company was reformulated as the Roosevelt Irrigation District (RID), but by 1927, RID still had not sold its bonds or begun work.

Agricultural improvement district lands that joined SRVWUA, 1920s



Another group of landowners, this one on SRP's eastern edge, also proposed to do business with the Association. The Auxiliary Eastern Canal Landowners' Association sought to irrigate 35,000 acres with a combination of floodwater and groundwater. However, the Water Users' Association had prior claims to the floodwaters of the Salt and Verde Rivers. The Auxiliary Eastern group had previously filed a notice of intent with the State Water Commissioner to construct a dam at the current site of Mormon Flat, but the Water Users' Association believed it had prior claims to the site.⁵⁹ To resolve the dispute, the two organizations reached an understanding. In June 1920, the Association approved a contract allowing the Auxiliary Eastern group to participate in the expansion of the South and Eastern Canals in order to accommodate the diversion of floodwater from Granite Reef to the group's canal, which branched off the Eastern Canal. Shortly thereafter, the Auxiliary Eastern group gave up its claim to the dam site, clearing the way for SRP's plans.⁶⁰

Decreased river runoff between 1921 and 1924 led to doubts over the adequacy of the Auxiliary Eastern project's floodwater supply, and the group experienced difficulty in selling the bonds necessary to finance the canal expansion and pumping plants. In 1924, the Auxiliary Eastern became yet another local district to appropriate the Roosevelt name, reorganizing as the Roosevelt Water Conservation District (RWCD) and renegotiating its agreement with the Association to add a new source of water. Engineers had determined that lining the South and Eastern Canals would save a large amount of water by decreasing seepage. A new agreement granted canal lining credits of approximately 72,000 acre-feet of water per year for ninety-nine years and allowed RWCD to store the credits in SRP reservoirs. The canal lining program was completed in 1928.⁶¹ That same year, RWCD celebrated successful crop production on 38,500 acres.⁶² As the result of later legal proceedings, SRP and RWCD renegotiated the agreement, allowing RWCD to receive a percentage of the total diversion from Granite Reef, granting them a more stable water supply.⁶³

THE BATTLE FOR THE VERDE

Another project threatened to cut off a vital part of SRP's water supply—the flow of the Verde River, which, though not contained by a storage dam, still constituted a large share of the irrigation diversion at Granite Reef. In the 1890s, the Rio Verde Canal Company had attempted to build a dam at the current site of Horseshoe Dam on the Verde River and a canal to carry water from there to lands in the northeast Valley. The Rio Verde project went bankrupt, and both the federal government and the Water Users' Association filed a notice of appropriation for the Verde floodwaters on behalf of SRP lands. The Paradise Verde Irrigation District (PVID) formed in 1914 to pursue a water supply for areas north of the Arizona Canal. Shortly thereafter, the Association filed a separate notice of appropriation on the Verde, this time for the current site of Horseshoe Dam.

In 1918, these competing plans came into open conflict in a hearing before Assistant

Secretary of the Interior E. C. Bradley. Bradley tried to work out a compromise between the two groups by which they could share the water of the Verde. The Association Board of Governors, however, stoutly refused to consider any plan that would limit SRP's use of the Verde. Based on its long-standing water rights, SRP was already using all the water of the Verde except for the floodwater that sometimes flowed over Granite Reef. In April 1918, Association shareholders voted for a special assessment of \$1.5 million to construct a dam at Horseshoe.⁶⁴

Having failed to find a compromise, the DOI sent engineer Homer Hamlin to study the PVID proposal in 1919. Hamlin's report strongly backed the Association's position that there was not enough available water in the Verde River to support a large new irrigation district and that what was available was already being used by SRP. Based on this report, Secretary of the Interior Lane rejected the PVID proposal but left open the possibility that the group could submit a revised plan, which it soon did.⁶⁵

A new presidential administration brought a new Secretary of the Interior, John Barton Payne, who gathered representatives from SRP, PVID, the USRS, and the US Indian Service in May 1920. The Association's proposal for a dam at Horseshoe rested heavily on the idea that past DOI policy had seen the wisdom of protecting SRP; however, Payne felt the two groups should cooperate on a plan.⁶⁶ The same month that the Association signed agreements of cooperation with RID and RWCD, it also participated in negotiations for a contract with PVID for its development of two dams on the Verde River.⁶⁷

Despite efforts to find a workable solution, the Association Board of Governors could not accept PVID's claims to the Verde and would not approve the contract. PVID was granted a permit to begin construction at the Horseshoe site, but their only financing mechanism was to sell bonds. This proved difficult due to conflicts with SRP interests and a lingering agricultural depression.⁶⁸ In response, the group reorganized with a new name, the Verde River Irrigation and Power District (VRIPD), which reflected the group's hope to generate and sell hydropower from its Verde dams. By 1926, VRIPD still faced financing issues. The next Secretary of the Interior, Hubert Work, continued to allow for extensions for the VRIPD permits while working with both organizations to reach an agreement to cooperate on a Verde project. Work asked both organizations to meet before the Senate Committee on Irrigation. After heated debate, the committee determined that a cooperative project implemented by SRP would be optimal for all concerned.⁶⁹ Between 1927 and 1928, VRIPD, the Association, and the US Bureau of Reclamation (USBR, formerly USRS) negotiated an agreement that provided for the construction of the Verde project and designated the amount of acreage available for irrigation in Paradise Valley as well as the Salt River Indian Reservation.⁷⁰ A negative vote of the Association shareholders in December 1929, however, eliminated this proposal.⁷¹

As a result of their contracts with the Water Users' Association, both RID and RWCD were able to complete their construction before the Great Depression and within the life of their contracts became successful irrigation districts. In contrast, because the Paradise Verde

project conflicted with SRP rights to the Verde River, no good compromise between the two organizations seemed possible. The Association shareholders stood firm on engineering and legal principles and argued that an adequate water supply had to be secured for the most productive lands. Without an agreement with the Association, VRIPD could not sell its bonds, and the project stalled for several years.

From 1917 to the end of the 1920s, the Association shareholders and leadership demonstrated an unrelenting commitment to the Valley's success. Managerial control of SRP was simultaneously a cause for celebration and a source of challenges. With a persistent focus on meeting the primary goal of supplying water to SRP lands, the Association took a firm, sometimes unyielding stance on water rights issues, protection of resources, and system-wide maintenance and improvements, while partnering with other entities to address common issues. The transition from federal to local control of the Salt River Project marked a major milestone for the Association, the Valley, and for reclamation projects in general. With its provision allowing the Association to keep power revenues, the 1917 contract laid the foundation for SRP's future as an important public power provider—an opportunity Association leadership would soon build upon. With SRP's new mantle of responsibility, the decade of the 1920s was a forward-facing time for the organization.



CHAPTER FIVE:

'WE ARE IN THE POWER BUSINESS'

As the Association continued to solidify its role operating the Salt River Project, its new leaders, Association President Reid and General Superintendent Cragin, defended the status quo on water issues. Stability, conservation, and respect for existing water rights were the pillars of irrigated agriculture, which was still the Association's primary concern. On the power side of the business, the two leaders understood that widespread electrical use was coming and that the only way to respond was to expand the SRP power business. Cragin, Reid, and members of the Association Board of Governors were part of the ebullient, business-oriented elite that was defining Arizona as a land of growth and opportunity. The Valley of the 1920s, at least after the postwar recession, certainly seemed to fulfill every promise of economic development. There were some shareholders, however, who questioned the wisdom of headlong growth and the role of the Association in promoting it.

THE HYDROPOWER INDUSTRY

From its inception, the electric power industry formed a "natural" monopoly similar to railroads. In both cases, private companies might fail to attract the necessary capital unless they had the exclusive right to serve a selected customer base. When "private," or investor-owned, electric companies were granted exclusive franchises, state agencies regulated their rates and profits. Cities, irrigation districts, and rural cooperatives could form not-for-profit, or "public," power districts that had the ability to raise capital through government loans, municipal bonds, or taxation. Public power districts operated under different rules of finance and taxation and were regulated by different laws.

At the time, the districts did not compete with investor-owned utilities (IOUs) for the same customers, but they often served adjacent areas, so their rates and services became a yardstick by which the public and regulators judged the performance of private utilities. The comparison often rankled the IOUs.¹

The 1906 addendum to the Reclamation Act allowed reclamation projects to generate hydropower to meet the construction and pumping needs of the project and to sell any excess power to help offset project costs. In selling such power, however, they were required to give preference to public power utilities, such as cities and irrigation districts. Only when such needs were satisfied could the reclamation project sell power to IOUs.² Under Reclamation

Service management, SRP sold power first to towns, irrigation districts, and Indian reservations. These entities had a limited need, so there was plenty of electricity left to sell to PG&E, the IOU that had a franchise to serve the Phoenix area. Early on SRP also sold power directly to mines, cotton gins, and other commercial interests.³

When the Water Users' Association took control of SRP in 1917, it was clear that the hydropower resource was not being used to its full potential. The Verde River still ran unrestrained as far as Granite Reef Diversion Dam. The Association used Verde water diverted at Granite Reef for irrigation whenever possible in order to preserve the Salt's flow in Roosevelt Lake. Roosevelt Dam only generated power when customers ordered water. The highly variable nature of this power supply meant that the Association could not deliver "firm" power—power that is always available up to a fixed maximum. Association General Superintendent Elliott had realized that failure to solve this problem could have long-term consequences.

If SRP did not provide "the quantity of power and the class of service demanded," it invited competition from private utilities or other irrigation districts that might build steam plants or even file for known hydropower sites on the Salt River below Roosevelt Dam.⁴ Such competition threatened the Association's \$4 million investment in the SRP power system and its ability to meet its repayment obligations to the federal government.⁵

With this understanding, the new management team of Reid and Cragin looked for power



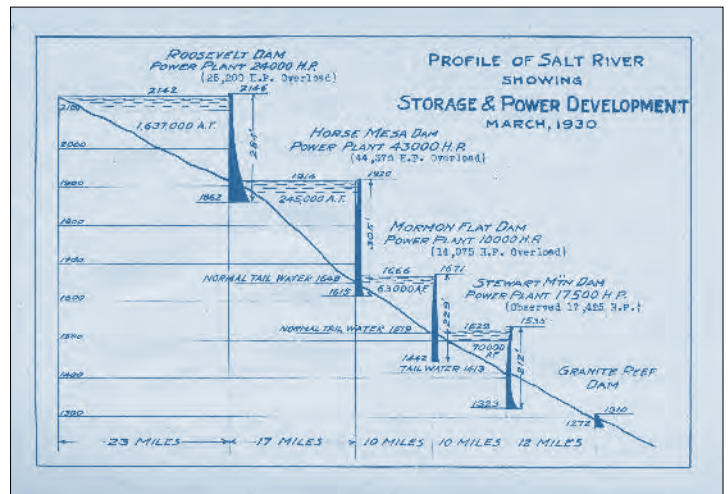
F. A. Reid and
C. C. Cragin, 1924

production opportunities. The ongoing dispute with the Paradise Verde district delayed any SRP development of the Verde River, but the SRP leadership was well aware of the power potential of the Salt River, which drops 600 feet between the base of Roosevelt Dam and Granite Reef Diversion Dam.

THE CRAGIN PLAN

Within a few months of his appointment, Cragin initiated investigations into potential hydropower sites on the Salt, completing a formal study in February 1922.⁶ This report explained the necessity of hydropower expansion, estimated the potential power development, and suggested financing and construction methods. The proposed Mormon Flat Development consisted of two dams below Roosevelt Dam. Mormon Flat Dam would hold water released in the winter for power production until the irrigating season. Another dam and power plant at Horse Mesa (between Roosevelt and Mormon Flat Dams) would greatly increase power production. The report suggested adding gates to the spillways at Roosevelt Dam, which would expand lake capacity by 270,000 acre-feet and increase the generating capacity when the lake was full. Plans also included expanding generation capacity at Roosevelt Dam from twelve to sixteen megawatts (MW) and upgrades to the Miami-Superior transmission line to increase power sales to the mines. These changes also allowed for better control of irrigation releases, because Mormon Flat was twenty-five miles closer to the canal headworks at Granite Reef. The increased water storage would also make it possible for another 10,000 acres of dry lands in the SRP area to finally officially join the Association and receive SRP water.⁷

Cragin produced a map showing that about 80 percent of the existing power load in Arizona (i.e., the total amount of power needed by all customers served), including most of the large mines and the cities of Tucson and Prescott, was within 110 miles of the SRP Salt River generators.⁸ There was no competitive source capable of delivering power in this area at a lower cost than SRP, and experts predicted the load would double by 1930. To meet that increased load, Cragin's plan was set to more than double the hydropower generating capacity of SRP, increasing it to more than 50,000 kilowatts (kW).⁹



Profile of Salt River showing water storage and power development, 1930

FINANCIAL POWER

An essential part of the Cragin plan was its financing. Up to this time, the Association's assessments of its members had paid for any improvements to SRP beyond those financed by



Arizona Representative Carl Hayden. Photo courtesy of the Library of Congress, Prints & Photographs Division, photograph by Harris & Ewing, Reproduction number LC-USZ62-123456.

Carl Hayden and the Politics of Water

Born at Hayden's Ferry (later Tempe) in 1877, Carl Hayden had a life and political career that coincided with the envisioning, establishment, construction, and development of an irrigated Arizona. After returning home from Stanford University to take over the family mercantile business, Hayden turned his energies to local and county politics, launching a career that lasted nearly three-quarters of a century. Elected to Congress as part of the State of Arizona's first delegation in 1911, he devoted much of his early career to the establishment and expansion of reclamation as a concept, an agency, and a set of policies. Representative Hayden also authored legislation that successfully saw the San Carlos Project through to completion and advocated ratification of the 1922 Colorado River Compact. Elected to the Senate in 1927, he was involved in various other legislative issues of the time, but the defining issue of his career was the Central Arizona Project (CAP), which he described as his "most significant accomplishment." Hayden determinedly shepherded CAP from the first bill introduced in 1947 through legal battles and congressional obstructions in the 1950s to the triumph of the Arizona v. California Supreme Court decision of 1963. The final authorization of CAP in 1968 also marked Hayden's retirement from politics, and he returned to his native Tempe for the remaining three years of his life.¹³

the federal government. A larger project like the Mormon Flat Development, however, required long-term financing through bonds. This proved somewhat complicated because the federal government held ownership of SRP facilities and therefore the Association had no assets to bond. Further, reclamation law offered no provision providing for the government to assume Association debts. The Association decided to issue general obligation bonds, which placed a lien on shareholder lands similar to the obligation which backed the repayment to the federal government. Because of this lien, general obligation bonds required a shareholder vote.¹⁰

Despite the nature of the bonds themselves, Cragin felt that long-term contracts for power sales to utilities and mines were critical to the success of Association bonds.¹¹ In 1920 the newly formed Central Arizona Light and Power Company (CALAPCO) acquired the franchise to provide electric power to Phoenix from PG&E. Shortly thereafter, the giant American Power and Light holding company acquired CALAPCO and greatly increased its financial resources. During this same era, the Inspiration Consolidated Copper Company of Miami was the largest industrial operation in Arizona and SRP's largest power customer. Growth and new processing methods were increasing its need for electrical power. Cragin sought long-term

contracts with these two customers to make Association bonds more attractive to buyers and ensure the sale of power from the Mormon Flat Development. However, at the time, federal law limited the power supply contracts for reclamation projects to no more than ten years. In 1922, the Association, principally through Congressman Carl Hayden, petitioned Congress for permission to enter into fifty-year contracts. Congress briefly considered a bill that would have applied to all reclamation projects, but there was clearly no other project on which power development was proceeding so rapidly. So in September 1922, Congress passed and President Warren G. Harding signed into law an act which allowed for the sale of surplus power specific to SRP.¹²

Although this legislation promised a bright future, the postwar depression still impacted the Association. Since financially strapped shareholders would have to approve any bond issue, Reid and Cragin decided to break the Mormon Flat project into two parts and build the smaller part first. In November 1922, the Board of Governors recommended approval of a \$1.8 million bond to pay for the improvements at Roosevelt Dam and the construction of Mormon Flat Dam. The board scheduled a shareholder vote for January 3, 1923.¹⁴ Reid and Cragin began an energetic educational campaign to win shareholder approval. The backing for the bonds would be provided by another lien on their lands, but management assured shareholders that the actual payment would come out of the millions of dollars of

projected annual power revenue from the upgrade of Roosevelt Dam and the ability to sell firm power year-round.¹⁵

Through letters and articles in local newspapers and the *Associated Arizona Producer*, Reid and Cragin promoted Mormon Flat Dam. “We are in the power business,” Reid wrote. “We cannot afford to stay out of the power business.”¹⁶ The *Arizona Republican* editorialized that the Mormon Flat vote was the most important decision for the Valley since the effort to build Roosevelt Dam, reminding its readers that “there is no one thing that helps to build up a community more than abundant cheap power.”¹⁷ Cragin assured the shareholders that the power income would pay the interest on the bonds and “operate the entire Salt River Project, pay the United States government the construction charges due, and care for \$50,000 per year of miscellaneous improvements.”¹⁸ Therefore, he predicted that assessments would never rise above \$1.30 per acre, per year. Cragin and Reid appeared at meetings throughout the Valley to explain the project and urge a large turnout in the election. “A well-filled house greeted Mr. Cragin on Friday night at the special Farm Bureau meeting,” the *Republican* printed. “Mr. Cragin is a very forceful and entertaining speaker, and his talk on the Mormon Flat Dam project was listened to with deep interest by all present.”¹⁹ The Association leaders hoped for a large turnout in the election in order to further ease the concerns of bond buyers and bring a higher bond price. They got their wish. On January 3, 1923, owners of 105,903 acres cast votes, and the \$1.8 million Mormon Flat bond issue passed by a ratio of fourteen-to-one.²⁰

The Association was so confident of voter approval that work on the Roosevelt Dam improvements actually began several weeks before the bond election. Nineteen curved steel Tainter gates, fifteen feet tall and twenty-one feet wide, were placed across the north and south spillways, supported in a concrete framework, and controlled by electric motors. Now, instead of simply flowing over the top of the spillways, the water could rise nearly to the top of the gates, which provided a measure of control over flood releases. A new 180-foot-long penstock was driven through the canyon wall to power the new 7,500 kW generator added to the powerhouse.²¹

Transporting penstocks up the Apache Trail to Mormon Flat, 1923

MORMON FLAT DAM

Both the cost of Mormon Flat Dam and the schedule of construction—estimated at twelve months—must have seemed remarkable to those who remembered the difficulties of building Roosevelt Dam. Roosevelt Dam, in fact, helped make Mormon Flat construction an easier task: Roosevelt Dam could control the river, the Apache Trail was ready to serve hauling needs, and the Roosevelt Dam power line





Mormon Flat Dam
Reservoir and
Hydropower Plant, 1935

was nearby and ready for connection. Also, rapid technological advances in heavy construction in the decades since the Roosevelt Dam project helped speed construction. Crews used electric- or gasoline-powered equipment as much as possible. Trucks brought cement from the Valley, and a nearby pit provided gravel. A one-yard mixer could produce 200 yards of concrete in an eight-hour shift and send it through chutes to any point on the dam.²²

Perhaps the main factor in the dam's swift construction, however, was the rapid evolution in dam engineering. Roosevelt functions as a gravity dam that holds back the reservoir by its huge mass. Mormon Flat is an arch dam in which the force of the impounded water transfers to the canyon

walls by the upstream arch of the dam. The entire structure, 229 feet tall and 90 to 325 feet wide, required only 43,000 cubic yards of concrete because of its relative thinness—only 22 feet thick at its base.²³

Cragin not only designed the dam but also supervised its construction with a workforce hired by the Association and with the help of engineers F. J. O'Hara, Thomas A. Hayden, and Harry Lawson. The principal difficulty of the work was the restricted space in the narrow canyon of the dam site. The river flow (needed for irrigation down in the Valley) passed through a wooden flume built along the south wall of the canyon. The site required very deep excavation to bedrock—seventy feet below the riverbed—so timbering and piling were fairly elaborate, and six pumps were constantly in use to remove water seepage. Excavation of the dam began in the summer of 1923, and the first concrete was poured the following March. A year later, construction on the north part of the dam had reached a height where it was possible to abandon the flume and let water pass through two openings in the completed section. By February 1925, the dam had closed off the canyon and reached half its ultimate height; within a few additional months, the dam was substantially complete.²⁴

By the time the Mormon Flat Dam was finished, the Association was in negotiations with CALAPCO to finance the hydropower plant at the site. Phoenix was booming, and CALAPCO wanted to take advantage of the energy potential of the water in Mormon Flat Reservoir.²⁵ Under this contract, the utility advanced \$410,000 to the Association to build the plant. In return, it received a guaranteed supply of power (or nearly guaranteed, because power

production could be curtailed due to irrigation needs) for twenty-five years, with options for another twenty-five years. The Association received a very favorable rate for the power, enough to repay to CALAPCO the advance with interest and earn more than \$300,000 from this plant alone in average rainfall years.²⁶

HORSE MESA DAM

The key to financing the other critical component of the Mormon Flat Development, Horse Mesa Dam, was a contract with Inspiration Consolidated Copper Company. Inspiration needed power for its Miami operations and agreed to buy a minimum monthly amount regardless of actual use or even availability (a “take and/or pay” contract). This minimum payment would bring in more than \$500,000 annually for twenty-five years, and Cragin was confident that Inspiration would buy almost all the additional power the plant could produce. In his presentation of the proposed contract to the Association Board of Governors and shareholders, Cragin estimated that Horse Mesa could produce a million dollars a year in total revenue.²⁷

Association shareholders voted in July 1924 on the Horse Mesa bond issue, a much more expensive and complicated proposition than the Mormon Flat bond issue they approved eighteen months earlier. Of a total package of \$4.7 million, the Association was directly bonding itself for \$2.5 million. An additional \$2.2 million came from two tax-exempt agricultural improvement districts as they prepared to join their lands to SRP—RAID and LAID (discussed in Chapter Four). The tax-exempt bonds of these districts brought a higher price, increasing the overall value to the Association.²⁸ This was the first venture of the Association into tax-exempt financing, a concept that became one of the distinguishing features of SRP.

Once again, Cragin and Reid stumped for a big margin of shareholder approval.

“The risk every farmer takes every year when he plants a crop,” Cragin said, “is a greater risk than the entire risk he will take with the Horse Mesa Project.”²⁹ This time, shareholders approved the expenditure by a twenty-to-one margin. Based on the success of the Mormon Flat bond issue and the lure of tax-free bonds, a San Francisco-based consortium bid a very substantial 97.64¢ on the dollar to finance the entire project.³⁰

The Horse Mesa Dam site was located between Roosevelt and Mormon Flat Dams, about ten miles upriver from the latter. The dam was taller than Mormon Flat and the canyon cliffs higher



Horse Mesa Dam, hydropower station, and reservoir (Apache Lake), 1927

and steeper, but the construction issues were very similar. Due to the dam's greater height—300 feet from bedrock to crest—the design of the dam was more difficult. The USBR, which retained approval of all aspects of the project, aided extensively in the complex calculations needed to

ensure a design that was both safe and economical. As with Mormon Flat construction, the Association acted as contractor. When Mormon Flat was finished, most of the workforce and the equipment simply moved up the road and began work on Horse Mesa. Due to the difficult terrain and the remoteness of the site, it took much longer to build a road from the Apache Trail down to the dam site, outfit the camp, and set up the work area than it had at Mormon Flat. Because of the steep, narrow canyon, it was necessary to blast the spillways out of the cliffs; the 550,000 cubic yards of rock removed for the road, spillways, and abutments amounted to more than three times the volume of concrete poured for the dam and power plant.³¹

The first concrete was poured at Horse Mesa Dam in May 1926. In less than a year, the dam was rising quickly and the powerhouse was completed and generating power, satisfying the Inspiration contract. As SRP Engineer Hayden said, "Horse Mesa is a power reservoir, pure and simple. Every drop of water in the Horse Mesa Reservoir must pay its way out by generating power before we release it."³³ The dam was completed by October 1, 1927.³⁴

STEWART MOUNTAIN DAM

Even with the construction of two new power dams, demand for electrical power in the rapidly growing Valley exceeded supply. The Association and CALAPCO cooperated in trying to satisfy customers without competing directly. SRP was still mainly a generator and wholesale supplier of power to CALAPCO, other irrigation districts, some small towns, and industrial customers. The largest customers were the copper mines in Miami, Superior, and Ray, but through their interconnections, the mines were also generators. During cutbacks in copper production, Inspiration sold some of the output to SRP to help satisfy other contracts.

SRP leaders had always considered power primarily a revenue source. The most efficient way to make money from power was to generate it and transmit it along a few main lines, leaving the distribution to others. Most of the early power contracts called for the customer to furnish all the lines, poles, and meters from the place of use to the SRP main line, which could be several miles away. The prosperity of the period was reaching SRP farms, fostering a desire for the same type of electrical service that was readily available in towns. In some

Camp on Stilts

The terrain at the Horse Mesa site was, in Cragin's words, "rugged and precipitous to an extreme degree." In addition to making the construction of the dam more challenging, this meant there was little space for a camp to house approximately 700 workers and their equipment. To meet this challenge, the Association built up instead of out: approximately twenty wooden structures were placed on stilts driven into the near-vertical walls of the canyon, including houses, an ice plant, and a schoolhouse, as well as a blacksmith, carpenter, and machine shop. The main camp buildings were constructed near the dam, with the rest of the camp spreading downriver, including a camp for Apache workmen and their families farther downstream. The camp buildings remained in service as housing for the dam tenders and their families through the 1930s, when concerns over the safety and long-term suitability of the employee living quarters prompted SRP to build a new camp at a stable site near the dam.³²



Horse Mesa employee houses on stilts, July 1927

cases, farmers formed small electrical districts to share these costs. By the end of 1927, nearly a thousand orders for farm electric service were waiting to be filled by the Association.³⁵ CALAPCO had been slowly extending lines out from its Phoenix service territory and now served as many as 3,000 Association shareholders—about a third of its total customer base.³⁶ In order to help fill these requests and provide power



Stewart Mountain
Dam, 1936

to its shareholders across the Valley, the Association implemented the final piece of the Cragin plan—the construction of Stewart Mountain Dam, a hydropower dam between Mormon Flat and the diversion dam at Granite Reef.³⁷ Using a now-familiar strategy, the Association entered into a fifty-year contract with CALAPCO to pay for the construction, but SRP still estimated that enough power would be left over to sell to other markets after meeting CALAPCO's needs. In February 1928, the Association Board of Governors approved both the Stewart Mountain contract with CALAPCO and a rural electrification plan that would bring power to all the farms of SRP.³⁸ As part of the contract, a territorial agreement reserved city limits and immediately adjacent areas for CALAPCO.³⁹ The Association reserved the remainder of SRP lands for electrical service.

In March, however, Association voters failed to approve either the necessary bond issue (which required a 75 percent mandate) or the changes in the Association Articles of Incorporation that would make the provision of retail electric service a purpose of the Association.⁴⁰ Management immediately called another election. The amendment to the articles had appeared to allow CALAPCO to expand into as much as 29 percent of the SRP area. Before the second election, a clause was inserted in this amendment stating that a “public service corporation” could not serve more than 15 percent of the SRP lands. To meet this provision, the Association would buy some of the installed CALAPCO lines to add to its system. The two systems could not be connected, however, because CALAPCO provided 60-cycle service whereas the Association delivered 25-cycle power. (Frequency changers converted the power CALAPCO bought from the dams.) With this slight change in wording, and after a much more intense educational effort by the Association leadership, the \$5.1 million Stewart Mountain plan passed easily in a second election in May 1928.⁴¹

Whereas Mormon Flat and Horse Mesa Dams had been built in deep canyons, the Stewart Mountain site was relatively broad and flat with plenty of room for a long spillway on the east end of the dam. As a result, it was possible to carry on all phases of work on the dam concurrently. This advantage contributed to an accident-free job and a quick one—concrete was poured between March 1929 and March 1930, by which time the power plant was also finished.⁴²



SRVWUA Merchandising Department advertisement, 1929

With the passage of the Stewart Mountain bond issue, Association work crews began installing 700 steel poles and eight rural substations over 400 miles across the Valley between November 1928 and September 1929. By 1930, SRP's power service area spanned a larger area than all the Valley cities combined and reached 80 percent of the homes within its boundaries, a remarkable number considering that only approximately 10 percent of farms nationwide had electric service at the time. SRP published advertisements to encourage people to use its safe and economical electricity, and it established two retail electric appliance stores—one in Phoenix and the other in Mesa. It would be another five years before Congress passed the Rural Electrification Act, which enabled the nation's farmers to build their own power lines and generate electricity.⁴³

'THE BEST INTERESTS OF THE SHAREHOLDERS'

Around 1923, a vocal group of shareholders began to question the policies of Association President Reid and General Superintendent Cragin. The questioning arose in part from Cragin's hydropower expansion program. Though power revenues increased six-fold in one decade, shareholder assessments continued to go up over the same period. Cragin had underestimated the difficulties of the hydropower expansion projects. Horse Mesa Dam, in particular, took longer and cost nearly a million dollars more than budgeted. Reid convinced the Association Board of Governors to make up most of this deficit through a short-term increase in assessments. In 1925, the assessment rose from \$2.00 to \$3.00 per acre, and in 1926, it rose again to \$3.96, despite a 60 percent increase in power revenues over three years.⁴⁴ Shareholders no doubt recalled that during the campaign for Mormon Flat, Cragin had promised assessments of \$1.30 an acre.

There was also dissension with regard to water policies. A group of shareholders strongly objected to the method of figuring the annual assessment, which normally entitled a shareholder to two acre-feet of water per year, even though most crops required three acre-feet or more. Shareholders thus often needed to buy additional water from the Association at rates that started at about 80¢ per acre-foot.⁴⁵

In 1926, these dissatisfied shareholders worked to remove Reid from office, drafting Thomas Maddock as their candidate. Maddock was a former state engineer for Arizona and a Republican candidate for governor in 1924. In some ways, this contest was an attempt to bring partisan politics into an Association election. The dissident group in the Association increased the turmoil with a series of attacks on Reid that were more notable for their baiting tone than for their elucidation of policies.⁴⁶ They accused Reid of personally profiting from Association policies and hinted at secret deals related to power contracts.

Reid easily won re-election, but it was clear that a portion of the Association membership was frustrated with his administration. In September 1926, more than a hundred shareholders petitioned the Secretary of the Interior to investigate the Association's finances and water

and power policies. Representing the "Committee for the Petitioners," Victor Steinegger wrote, "For several years, there has been a more or less definite impression in the minds of shareholders . . . that the affairs of their association were not being managed to the best interests of the shareholders."⁴⁷ The Secretary of the Interior responded by appointing engineer H. T. Cory to investigate SRP. Cory considered all the charges of the dissidents; his report in October 1927 exonerated Reid of malfeasance but did voice some cautions.⁴⁸ In summary, Cory noted that Reid and Cragin got things done in a way that was uncommon for an irrigation enterprise and, on balance, deserved commendation. He wrote, "In comparison with the usual shilly-shallying, vacillating, and timorous managements all too common in irrigation enterprises, that of this Project stands out boldly."⁴⁹ The Cory Report made headlines for a day or two, but it did not result in a change in management or pacify the dissident group.⁵⁰

With the completion of Stewart Mountain Dam, Reid declined to run for a sixth term as Association president. Despite oppositional persistence, his tenure had seen the triumph of aggressive expansion and development of the Valley's economy. Pumping had drained waterlogged lands and augmented the water supply. The Association had evolved from a wholesale generator of power to a utility, providing electricity to its shareholders across the Valley. Most impressive of all was the construction of three large dams on the Salt River, all with hydroelectric generating facilities, in a little more than seven years.

By the summer of 1926, the Valley began to realize its long-held ambitions. For years, the slogan of the *Arizona Gazette* had been "Phoenix Must and Will Have a Mainline Railroad," and in the early fall of 1926, this slogan became a reality when the Southern Pacific line from Gila Bend reached Phoenix. The population of Phoenix had increased from 29,000 to 48,000 since 1920; there were 25,800 automobiles registered in Maricopa County; fifteen new subdivisions were under construction in and around the city; and 4,000 students attended the Phoenix high school and junior college. Local newspapers felt justified in referring to the Valley as the "Gold Spot" of America, certainly thanks in part to the reliable supply of water and power provided by SRP.⁵¹



CHAPTER SIX:

PULLING TOGETHER

By many measures, the Great Depression was milder in the Salt River Valley than in other parts of the country. Nevertheless, it was a time of contraction and conservation for all but the most prosperous residents.¹ Prices for farmed goods began falling in 1930, and the Arizona copper industry tailed off to practically nothing by 1933.² The shrinking economy meant tough decisions for SRP and the people living in the Valley. During the 1920s, SRP was a major force in the rapid development of the region, as it built and financed three power dams and electrified local farms. During the Depression, SRP developed and maintained power and water infrastructure and initiated creative financing opportunities, which were essential for supporting the Valley community as it faced the stress of the economic downturn.

A NEW REPAYMENT AGREEMENT

Although the “Black Tuesday” stock market crash of October 1929 was worrisome, the Valley felt little immediate effect. Business activity in Phoenix, which reached record levels in 1929, decreased only slightly in 1930, and Arizona’s major industry—mining—sustained production near 1920s levels. Crop returns in the Valley, however, were the lowest since the cotton bust year of 1920–21. Though this decline was partly the result of a pink bollworm infestation that destroyed thousands of acres of cotton, market prices for alfalfa, lettuce, cantaloupes, and citrus all went into extended decline. The intermittent drought conditions that had dogged the region through much of the decade reappeared in 1929.³ Despite an increased storage capacity of 2 million acre-feet with the completion of Stewart Mountain Dam, the total

water storage in the SRP reservoirs dipped dangerously close to 100,000 acre-feet for only the second time since the completion of Roosevelt Dam.⁴ In response, SRP looked to Valley groundwater supplies and implemented an emergency program, which included installing forty-five new high-capacity pumping plants in less than ten months. Individual shareholders who participated in the groundwater development program paid assessments levied against their lands.⁵ Due to these financial setbacks, the December payment to the federal government was in jeopardy, and despite past controversies with the government over the Association's repeated requests for payment deferrals, management felt it had little choice but to request another delay.⁶

The appeal struck a sympathetic chord in the nation's capital. After all, the Association was merely acting as the agent for shareholders—the actual beneficiaries of the reclamation project. Indeed, in the aftermath of the stock market crash, the federal government had buttressed crop prices and sustained the farming community with subsidies. Given this national commitment, USBR Director Elwood Mead was reluctant to embarrass irrigators who could not meet their assessments and recommended that the Secretary of the Interior approve the requested delay. The Secretary granted the postponement.⁷

Valley residents welcomed the news. The Association had taken on more than \$11 million in bonded debt during the 1920s to build the three lower Salt River dams. In addition, it still owed the federal government \$4.8 million for Roosevelt Dam and the rest of the original SRP construction costs. Despite optimistic predictions, reliance on power revenues and shareholder assessments to handle this debt load had proven intermittently successful. Cragin and Association board member James Minotto traveled to the nation's capital in late April 1930, where they met with President Herbert Hoover, Secretary of the Interior Ray Lyman Wilbur, and USBR Director Mead. Cragin and Minotto proposed to borrow \$3.6 million from the Federal Farm Board for a balloon payment to the USBR and to pay the remaining \$1.2 million in annual installments through 1956. The government would still benefit despite the longer payout by earning interest on the Farm Board loan.⁸ Mead recommended that the government accept the SRP proposal, and Wilbur signed his approval.⁹

The SRVWUA election of 1930 took place at the same time that debt reduction negotiations were underway in Washington, DC. Cragin and Minotto found upon their return to Phoenix that the proposal they presented to federal officials no longer had the unanimous support of Association leaders. New SRVWUA President John H. Dobson was skeptical about the ability of the Association to take on a new \$3.6 million obligation given the economic crisis. Instead, he sought to institute a program of "rigid economy" and favored a modified version of the plan that called for a twenty-year repayment period and a smaller Farm Board loan. Though appreciative of Cragin and Minotto's efforts, the Board of Governors voted to endorse the second plan and quickly dispatched Dobson, along with attorney Richard

Sloan, to address the matter with government administrators. The trip proved to be a mere formality: Cragin and Minotto had laid the groundwork for a new repayment agreement, and federal officials simply approved the revised numbers.¹⁰

ORGANIZATIONAL TRANSFORMATION

The period of 1930–34 was a contentious one across SRP, from the board and management to the Association members. In 1930, shareholders dissatisfied with the policies under Reid formed a Farmers' Ticket, putting forth a complete slate of candidates for the board and presidency. Farmers' Ticket candidate John H. Dobson won the presidency, and the ticket also won two board seats. The incumbent ticket took the vice presidency and the remaining board seats.¹¹ Dobson campaigned on the slogan "Too much land, too little water, too high assessments," which encapsulated the Farmers' Ticket belief that existing policies had overcommitted the water supply and the finances of SRP.¹²

With the retirement of Reid, the dissident faction focused its disfavor on General Superintendent Cragin and Association counsel John L. Gust. Cragin's opponents believed that the construction of the three new hydropower dams on the Salt River threatened the financial security of the Association and the farmers.¹³ The Farmers' Ticket won six of the ten seats in the 1933 board election. The former dissidents made quick use of their new majority. In their first meeting, the board replaced Cragin and most of the other top officers of the Association. H. J. Lawson, formerly the chief engineer in the power division, became the General Superintendent. Richard E. Sloan took over as Association legal counsel. Sloan and his partner Greig Scott had been allies of the Farmers' Ticket.¹⁴

Cragin went on to a long and distinguished career with the El Paso Natural Gas Company. He shares credit with Reid and other Association leaders of the 1920s for the remarkable foresight and the daring to build up the power side of the business. Unquestionably, Cragin recognized that electric power was the key to the future growth of SRP, but it took decades for Valley development to catch up with his vision. In his 1931–32 report to the Association president and Board of Governors, the last he would write, Cragin quoted a government report on the project: "The value of the power system to the project has been fully proven, and it is believed that the high standing of the Salt River Valley Water Users' Association in the financial world today is largely due to the successful and conservative manner in which it has in the past twelve years financed and constructed, without government funds, a development of \$20 million and also paid \$7 million on the original \$10 million debt to the United States."¹⁵

In 1934, the Farmers' Ticket elected Lin Orme as president and took seven of ten board seats.¹⁶ Orme was the nephew of former SRVWUA President John Orme, and he brought with him a firm commitment to the success of the organization. He was also an experienced politician, having served as a state legislator and chairman of the state Board of Pardons and

Paroles. He held the position of SRP president for fourteen years, gaining the affectionate nickname “Old Two-Thirty,” because \$2.30 per acre was the irrigation assessment through most of his administration.¹⁷

THE AGRICULTURAL CREDIT FINANCE CORPORATION

As the Depression deepened, despite federal efforts to bolster the farm community through subsidies, agricultural interests across the country suffered. In the Valley, restructuring SRP’s construction debt provided a measure of relief for Association shareholders by lowering assessments.¹⁸ Unfortunately, financial matters had become so grim for Association shareholders that many had trouble paying even the reduced assessments.¹⁹ Furthermore, few sources existed for farm relief or credit, as most banks refused to grant crop loans or extend credit to the agricultural sector. Many local farmers found themselves strapped for the necessary cash to survive until harvest or to plant new crops. Yet the Association remained “the one creditworthy institution in Arizona” during the Depression, according to SRP’s longtime Washington lawyer Northcutt Ely. SRP’s solvency was largely due to the so-called “headgate law” whereby the Association required farmers to pay their assessments before any water would be delivered. “All other debtors might have to wait,” Ely later recalled, “but if the farmer didn’t pay his assessment, the mortgage-holder would: he couldn’t afford that land to lie fallow. . . . This rankled, but it was the salvation of the Project during the Depression.”²⁰

Making matters worse, the price of copper fell 80 percent by 1932, devastating the mining industry. Many area mines either closed or drastically curtailed operations, leaving thousands of miners unemployed and signaling the worst days of the Great Depression in Arizona.²¹ The closure of the mines meant a large reduction in SRP’s power revenues.²² Association leaders feared that even a modest increase in unpaid assessments could push the Association toward default on its obligations. Therefore, they began to explore ways to provide financial aid for shareholders and other Valley farmers. The plan that received the most enthusiastic support was the development of a lending organization specifically for farmers. Shortly following the stock market crash, the Hoover administration had created the Reconstruction Finance Corporation (RFC) to supply assistance to financial institutions unable to obtain advances from customary sources.²³

With approval by the Board of Governors, the SRVWUA acquired the recently formed Agricultural Credit Finance Corporation (ACFC) in June 1932, and the following month, it applied for an \$880,000 loan from the RFC. The RFC insisted that every SRP landowner sign individual promissory notes for \$5 per acre and that the Association pledge to collect the money. The Association collected the signatures of some 11,000 shareholders and obtained a \$350,000 loan from a Los Angeles bank to help capitalize the finance corporation. After using some of the funds obtained through the RFC to retire outstanding loans, the Association was in a position to issue farm loans guaranteed by its assets and credit. In this way, the

organization made more than \$1 million available to Valley farmers for emergency credit and crop financing.²⁴ By the end of 1932, the morale of the Valley agricultural community began to improve. Although the ACFC had lent only about \$130,000 up to that time, observers noted that it was sufficient for farmers to know that they could obtain credit if needed. Additionally, the mere existence of the corporation helped reassure private creditors. As the *Arizona Producer* reported, “Everybody feels better. Fear has given way to hope.”²⁵

SRP had become a major player in the agricultural recovery efforts in the Valley. By the time the Great Depression was waning, RFC loans to Valley farmers totaled almost \$6 million.²⁶ The vast majority of these loans were paid when due, so the Valley farmers’ promissory notes were never in danger of being called. As had been the case with both the original SRP construction and the corporate bonds for the Cragin power plan, the farmers were the beneficiaries of both the ACFC and the corporation’s trustees. The role of SRP in all three transactions was to ensure that the shareholders’ investment was sound.

THE VERDE RIVER CONTROVERSY

While the Association was working to shore up the Valley farming economy, the long-running dispute with VRIPD erupted again. When Association shareholders failed to approve an agreement previously negotiated by VRIPD, the Association, and the USBR, Secretary of the Interior Wilbur granted VRIPD a new five-year window to begin implementation of its development plan.²⁷ The Association consistently stated that VRIPD’s plan threatened the water rights of shareholders. With the onset of the Great Depression, it quickly became apparent that VRIPD would not be able to finance construction through the sale of corporate bonds—the project would require federal funding to succeed. The new VRIPD president, Burt Clingan, touted the Verde development as a work relief project and a way to fulfill the government’s obligation to provide water to the Salt River Indians and began to recruit members of Arizona’s Congressional delegation to advocate for the project.²⁸ However, due to the constraints of the Depression and opposition from other Valley interests, federal funding proved elusive.²⁹

Despite the opposition by multiple entities with water rights claims to the Verde, on November 3, 1933, Secretary of the Interior Harold Ickes announced that the Public Works Administration (PWA)—the agency charged, in part, with making allotments to enable other federal agencies to execute construction work—would lend the USBR nearly \$19 million to finance the Verde project. According to the terms of the loan, the PWA would provide an initial disbursement of \$4 million to begin preliminary surveys and construction of a dam at Camp Verde.³⁰

With funding thus secured, the USBR established a field office in Phoenix and commenced the necessary studies along the Verde.³¹ The new project faced challenges almost immediately. First, with most of the largest consumers of SRP electricity out of business or in reduced operations, the Association had difficulty meeting its federal repayment obligation. If SRP—

the model of a successful reclamation project—could not sell its power and was barely carrying its debt, many questioned how the new VRIPD project could succeed when the dam construction cost was estimated at more than \$200 per acre, three times more than the assessment on SRP lands “in high state of cultivation.”³² Second, the continued drought throughout the state weakened the credibility of Verde River water supply studies. Finally, the agriculture and reclamation policies of the new Franklin D. Roosevelt administration conflicted sharply with each other. While the Agriculture Department was busy reducing the amount of cultivated acreage to stimulate crop price increases, the Verde project would bring more land under cultivation.

Although Association leaders presented all these arguments in their persistent opposition against VRIPD, they focused primarily on the inconsistency of the administration’s policies.³³ Facing this opposition, USBR Director Mead had little choice but to order another study of the Verde project’s viability. This study termed the undertaking “not feasible” and advised the USBR to reassess its position.³⁴ Mead had voiced clear expectations that established projects be protected, especially successful ones like SRP, and this new study strengthened that position.³⁵

In light of these new developments, SRP seized the opportunity to establish a foothold on the Verde River and announced its intention to request a \$6 million federal loan to construct Bartlett Dam.³⁶ Based on the more recent findings around water supply issues, Arizona politicians shifted their support from the Verde project to ensuring that Arizona received the infusion of federal dollars for river development that guaranteed success.³⁷ On October 4, 1934, with the tide turning against the Verde project, Ickes revoked VRIPD’s loan from the PWA. Although the SRP plan still required a dam, the cost was spread over 250,000 acres.³⁸ Obtaining financing for the new dam was far from a certain proposition, however. In securing it, SRP’s management under Association President Lin Orme exhibited an innovative and forward-thinking spirit equal to that of Frank Reid and Charles Cragin a decade earlier.

FORMING A DISTRICT

Even after the 1930 refinancing of its government debt through the Farm Board, SRP still faced bond obligations for the construction of Mormon Flat, Horse Mesa, and Stewart Mountain Dams. SRP launched a new initiative to refinance the higher-interest debt with a consolidation loan from the RFC. Despite enthusiastic local support for the idea, it quickly ran into roadblocks. The most challenging hurdle centered on the agency’s enabling legislation. To support farm production, the new law authorized the RFC to lend money to irrigation districts and similar organizations, but the language did not include water users associations.³⁹ SRP leadership worked with Arizona’s congressional delegation in Washington and, after months of political wrangling, succeeded in amending the legislation to ensure inclusion.

The amendment came at a good time. Not only did it make the Association eligible for RFC money to refinance its debt, but it ultimately proved to be a vital factor in the drive to

obtain financing for Bartlett Dam. The PWA rejected the Association's first application, citing concerns about SRP's indebtedness and the ability of shareholders to withstand the added payments a new \$6 million loan would incur. With the rejection came a suggestion that if the Association refinanced its debt, the government would reconsider the project.⁴⁰

As SRP's application for refinancing made its way through the RFC, the RFC imposed on the Association its own contingencies that tied its approval directly to improvements on the Salt-Verde River system. To ensure stabilization of SRP's long-term water supply, first, Bartlett Dam needed to be constructed on the Verde River. Second, RFC officials also called for necessary improvements after the Bureau of Reclamation had concluded in 1933 that the Salt River dams had become susceptible to flood damage.⁴¹ But before it could build, the PWA required the Association to refinance its existing debt. After several months of negotiating, SRP forged a conditional resolution with RFC officials which stipulated that the agency would be obligated to purchase outstanding Association bonds after the completion of rehabilitation and construction work.⁴² The PWA, satisfied by the Association's refinancing plans, approved the \$6 million loan to the USBR for construction of Bartlett Dam. Four months later, on November 26, 1936, the Association and the US government signed a formal contract for the work.⁴³

With authorization of both the PWA and RFC loans, SRP had taken a large step in improving conditions for the organization and Valley farmers. The PWA loan offered favorable terms, including forty interest-free annual payments. This meant that the savings from refinancing could offset costs for building Bartlett Dam. SRP now proceeded to develop the Verde River at a nominal cost to shareholders in the short term while actually reducing its long-term debt. According to SRP's calculations, it could make up the cost of the dam and more in forty years through savings on groundwater pumping.⁴⁴

One hurdle remained: The RFC lent money at an interest rate of 4 percent or less, and SRP's outstanding bonds at the time carried rates of 5.5 to 6 percent. One way to make 4 percent bonds more attractive to investors would be to make them tax-exempt, but this was something that only municipal organizations or public improvement districts had the statutory authority to do.

SRP President Orme and the Board of Governors understood that the organization's responsibilities were consistent with those of irrigation districts formed under the Arizona Agricultural Improvement District Act of 1922.⁴⁵ Therefore, SRP pursued formation of an agricultural improvement district that encompassed its service area. The new entity would operate as a vehicle for issuing SRP bonds and refinancing existing bonds at a marketable rate.⁴⁶

Steps toward establishing a district proceeded throughout 1936. Early on, some shareholders opposed the formation of the district because of the proposed voting structure. At the time, the proposed district, unlike the Association, planned to implement a "one person, one vote" system. This group of shareholders preferred the Association's acreage-based system, which was tied to the per-acre assessment—large landowners took on a bigger share of the Association's financial risk and therefore had a larger voting stake.⁴⁷

In response to these concerns, Association leaders met with legislators to modify the existing agricultural improvement laws. In November 1936, the legislature went into a special session to pass emergency Social Security legislation and at that time passed an amended version of the Agricultural Improvement District Act. The revised statute included three important changes to the law: (1) allowing acreage-based voting; (2) allowing districts to finance and refinance bonds of an existing organization for the construction of works necessary for irrigation, drainage, or power for lands within a district; and (3) declaring a district to be a “public, political taxing subdivision of the state,” conferring upon it municipal status, including immunity from taxation.⁴⁸ On December 23, 1936, the Maricopa County Board of Supervisors approved the Association’s second petition, referring the measure back to voters in the proposed district for final ratification. Four weeks later, landowners voted in favor of forming the Salt River Project Agricultural Improvement and Power District (SRPAIPD, the District) by a wide margin. As part of that ballot, W. M. Scott, John W. Pendergast, and W. Wilkins won seats on the District’s first board of directors.⁴⁹

The formation of the District opened a new era in the history of SRP. Up until that time, the Association (with federal oversight) had managed the SRP irrigation and power facilities. Establishment of the District, however, altered that dynamic by creating two organizations with linked identities. From the outset it was clear that although the two governing bodies remained separate and distinct, there would be a close affiliation between them, given the reasons for creating the District. Therefore, a contractual agreement was drafted in 1937 that spelled out the exact duties and functions of each entity. The District assumed control of all fiscal operations, including bond issues and refinancing arrangements, while the Association remained the agent of shareholders and the trustee of the federal reclamation project. In addition, the District received title to all property held by the Association.⁵⁰

The 1937 contract added a new layer to the multiple identities of SRP. Now it was not only a private association (under the Association Articles of Incorporation) and an operator of a federal reclamation project (under the 1917 contract with the federal government), but it was also an agricultural improvement district of the state of Arizona. One of the most important aspects of SRP’s new Arizona district status was the release from tax obligations. Tax-free status made it easier to finance improvements to irrigation facilities and to lower the cost of water for shareholders while still providing low-cost power to all SRP customers, including non-shareholders.

Throughout the spring and into the summer of 1937, the District and the Association tested this arrangement at both the federal and state levels to determine its validity. In May, the Secretary of the Interior accepted the contract on the condition that any “remedy available to the United States against the Association by virtue” of its contracts would also be enforceable against the District.⁵¹ In July, the Arizona Supreme Court ruled in several friendly lawsuits that the relationship was legitimate and had legal standing. The court concluded not only that

the Agricultural Improvement District Act was constitutional but also that the state legislature had the authority to pass an amendment allowing a district to refinance construction costs incurred by another organization in the development of irrigation systems.⁵²

With the contract approved and found satisfactory by the government and the highest court in Arizona, the District proceeded to assist with Association financing. One of the primary reasons for the District's creation was to secure refinancing through the RFC, but with its designation as a political subdivision of the state, that funding source became unnecessary. The District could now use its tax-exempt status to issue municipal bonds, and it sold \$13 million worth in October 1937. Proceeds from this sale were used to redeem SRP's outstanding higher-interest bonds.⁵³

BARTLETT DAM

By early 1938, the Association had significantly reduced its debt and repairs were underway to improve the existing dams. In addition, the construction of Bartlett Dam had commenced, not only providing much-needed jobs for unemployed Arizonans, but also offering hope of additional stored water to ease pumping costs and mitigate the effects of continued drought. Construction of Bartlett Dam also provided a way to ease the water problems on the Salt River Pima-Maricopa Indian Reservation, which had been seeking a water supply for 6,300 acres of allotted homestead tracts since 1916, when the US Congress directed the Secretary of the Interior to provide the additional water.⁵⁴

Construction of Bartlett Dam was well underway by the time the new District became formally established. The Bureau of Reclamation returned as the builder of the dam and the Barrett & Hilp and Macco Corporation earned the contract for the job. Preliminary work began immediately, with the expectation that contractors would complete the work in 1,000 days. By the end of the summer, the first camps, roadways, and appurtenant works were near completion, and foundational work at the dam site had commenced.⁵⁵

The dam itself began to rise in early 1937 and took shape over a two-year period. Significant flooding in the winter of 1936–37 slowed progress, but contractors made substantial headway throughout 1938. During that time, crews focused on finishing the dam's massive arches and buttresses, features that would give the structure a unique appearance. The multiple-arch design of Bartlett Dam made economic sense in the context of the Depression; the thin and hollow arches needed less concrete than more traditional structures yet required



Bartlett Dam under construction, view from upriver, 1938



Aerial view of Bartlett
Dam and reservoir

more labor, providing jobs during a stressed economic period.⁵⁶

Despite the persistence of high unemployment rates in Arizona, contractors found it difficult to employ enough laborers throughout the construction process. Barrett & Hilp and Macco asked the US Employment Office to assign skilled construction laborers. They were told, however, that the types of workers needed were not available. Instead, the firm turned to local organized labor groups, signing contracts with most of Arizona's major unions. Nevertheless, the firm still had difficulty keeping people on the

job as potential employees refused to work at the wage scale stipulated in the contract.⁵⁷ Most laborers were receiving 50¢ per hour but had to pay \$1.43 per day for room and board. Finally, after several requests, the USBR authorized raising wages to ensure completion of the dam.⁵⁸

Although these problems jeopardized the project at various times, crews finished Bartlett Dam in 1939 and met the contractual deadline. The reservoir that formed behind the dam, Bartlett Lake, stored approximately 180,000 acre-feet of water over a surface area of 2,815 acres. In October, SRP received operation and maintenance responsibilities for the dam from the USBR, thus concluding a long and difficult chapter in the life of the Verde River.⁵⁹

SUCCESS IN HARD TIMES

People throughout the Valley faced the economic challenges of the Great Depression with creativity, ingenuity, and determination. SRP was a linchpin in effectively addressing important steps toward economic recovery. Internally, it maintained a stable financial footing through deferred or extended debt repayment and developed effective financial relief programs for shareholders and other Valley farmers through the ACFC. These efforts were possible largely due to SRP's ongoing relationship with the state and federal governments. Bartlett Dam, financed with federal funds and built by the Bureau of Reclamation, symbolized the important ties between SRP, the Valley, and the federal government. These ties strengthened through World War II. Bartlett Dam also represented increased flexibility and water storage capacity for the Valley. Perhaps the most important event for SRP during the Depression years was the establishment of the District as a public organization authorized by Arizona state law. The District and its relationship with the Association would assume more importance in future years as the critical services SRP provided—water and power—helped spur the Valley's continued growth and development.



CHAPTER SEVEN:

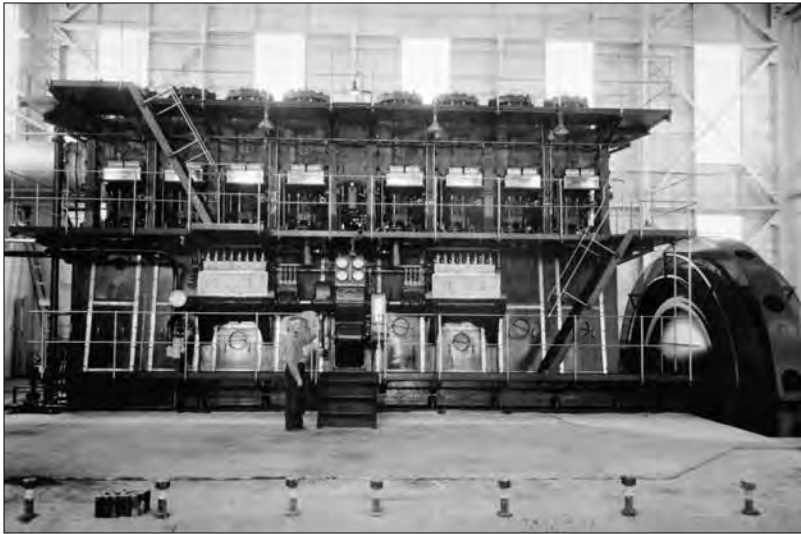
FOUNDATIONS OF THE FUTURE

SRP played a crucial role in addressing the depression and drought facing the Valley in the 1930s. The establishment of the District allowed for greater flexibility in financing water storage efforts while SRP implemented its rural electrification plan. Similarly, the 1940s brought difficulties and opportunities for SRP and the Valley as the nation fought in World War II. SRP faced these challenges with its characteristic innovation and collaboration—from implementing a complex water exchange to aid the war effort to solidifying the organization’s modern structure and culture.

DIESEL AND STEAM POWER

As the drought of 1938–40 confirmed, SRP’s central problem as a provider of power was its dependence on flowing and stored water as a generation source. The three hydroelectric dams on the Salt River required sufficient water to juggle the needs of both power generation and irrigation. By the late 1930s, SRP recognized the need to reevaluate its power portfolio, particularly with the coming changes to the water delivery system in conjunction with the construction of Bartlett Dam on the Verde. In 1937, the company hired consulting engineer W. R. Elliott (formerly SRP General Superintendent) to study the power situation and make recommendations that would best serve future customer needs. He determined that with the growing demand for firm, continuous power, it was essential to separate power service from the complicated obligations of delivering surface water. He concluded that the time had come for SRP to “accept the fact that . . . [it] is in the power developing and selling business” and to respond by implementing the best practices of

Crosscut Diesel Plant interior, 1938. Photo courtesy of the Library of Congress, Prints & Photographs Division, HAER, Reproduction number AZ-20-19.



successful contemporary power companies. Elliott's priority recommendation was to build into the existing system at least 15 MW in the form of three 5 MW diesel generating units as permanent standby power. Additional recommendations focused on modernizing existing generators and transmission facilities across the system for improved capability and efficiency.¹

SRP launched a standby power initiative with the construction of a new power

generating station next to the Crosscut hydroelectric facility near present-day Papago Park.² Work began on the Crosscut diesel station in September 1937, and the initial two units, each with 10 MW of generating capacity, went online within a year. At that time, they were the largest diesel-powered generators in the country.³ Within a few short years, as the need for electricity steadily climbed, three additional oil- and gas-fired steam generating units were installed in the same building.⁴

WORLD WAR II

In response to the United States' needs during World War II, SRP halted construction projects and diverted manufacturing materials to the war effort. The Depression ethic of "make do or do without" carried over into wartime. However, shifting from the job shortages of the 1930s, the needs of the military and defense industries created labor shortages throughout the country, leading to unprecedented job opportunities for minorities, women, and immigrant workers. SRP, like other local businesses, exercised new and innovative strategies, including



Italian POWs working on the Arizona Canal, December 1943. Photo courtesy of the Library of Congress, Prints & Photographs Division, HAER, Reproduction number AZ-19-19.

employment of Italian and German inmates from nearby prisoner-of-war camps.

During World War II, over 600 internment camps across the United States housed more than 425,000 German, Italian, and Japanese prisoners of war (POWs). There were more than twenty camps in Arizona, including four in the Salt River Valley, where many of the prisoners worked on SRP projects, such as cleaning and maintaining irrigation ditches. They were required to wear marked uniforms with the letters "PW" sewn into their clothing. Divided

into squads of around twenty and watched over by a single guard, the prisoners earned between 40¢ and 42¢ an hour for their labor. After Italy's surrender to the Allies in September 1943, most of the Italian POWs returned to their native country and German prisoners took their places as ditch laborers. By July 1944, approximately 150 Kriegsmarine (the navy of Nazi Germany) and merchant seamen were housed at Camp Papago Park, the site of one of the largest POW escapes on US soil.⁵

SRP's Crosscut Canal marked the eastern boundary of Camp Papago Park. The camp consisted of several prisoner compounds, a hospital, and recreation areas. In addition to the POWs at the camp, American civilians and service members lived on-site to operate the camp. On December 23, 1944, twenty-five prisoners from the camp escaped through a tunnel they dug out to the banks of the Crosscut Canal. Several men smuggled out supplies to construct a raft and planned to float down the Crosscut, make their way to the Gila River, and ultimately arrive in Mexico. However, with the low flows in the Salt and Gila Rivers, this plan proved unsuccessful. Eventually, all of the escapees were captured.⁶

More than 180 SRP employees served in the armed forces during World War II. Their fellow workers on the homefront made sure they did not feel forgotten, sending issues of the company newsletter, the *Current News*, and more to wherever they were stationed. In return, SRP received correspondence from around the world, often printing it in the next issue for sharing across the company. "Your gift of the *Reader's Digest* is more appreciated than I can tell you in a letter," wrote employee and serviceman Lawrence Deubler. "I also enjoy receiving the *Current News*—it keeps me abreast of the activities of the company and my friends."⁷ "To my knowledge," added William Embry from Tinian Island, "there aren't any of the other fellows in my platoon receiving an official company employees' paper. I enjoy reading it from the front to the last article."⁸ SRP had one woman in military service—Martha Ross, enlisted in the Women's Army Corps. She wrote from Camp Wheeler, Georgia, expressing thanks for the newsletters: "You have no idea what a happy feeling the *C.N.* gives us in the service. . . . I just soak up every item."⁹ The only SRP employee known to have died in the war was Antonio A. Olivas, and his name is marked prominently on the company "Victory Flag."¹⁰

The Current News

The Current News, SRP's monthly employee newsletter that began circulation in September 1941, earned its clever name from an employee contest that garnered 200 entries. President Orme donated a \$5 cash prize for the winning submission. The compelling purpose for the newsletter was to create a two-way communication between employees serving in the wartime military and employees serving on the homefront at SRP. Additional support of the war effort appeared in articles encouraging the purchase of US savings bonds and support for the Red Cross and the Community Blood Bank. The *Current News* also tapped into a playful, personal side of the company, often featuring employee-penned poems, humorous cartoons, and occasional gossip.

The first steps toward professionalization of the newsletter began in 1942 when SRP management decided to cover the costs of the publication and make the journal an official arm of the organization. From 1941 to 1958, Editor Nina Duncan transformed the *Current News* into a significant corporate publication that earned top honors from the Phoenix Advertising Club during the 1950s. In 1967, the *Pulse* became the primary SRP employee publication.

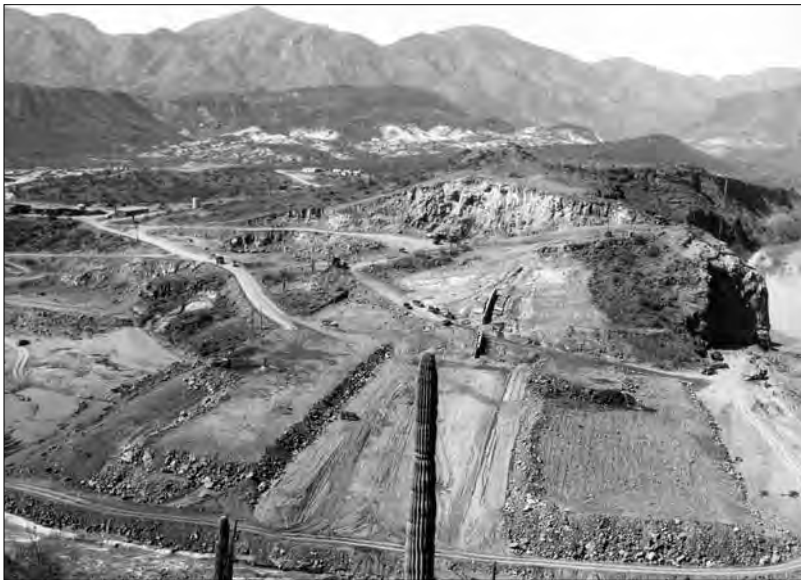


The July 1942 *Current News* encourages employees to purchase war bonds.

HORSESHOE DAM

As it had during World War I, the agricultural economy boomed during the war years in the 1940s. However, Arizona's greatest material contribution to the effort was copper. The demand for water, which was necessary for copper processing, led to the construction of the seventh SRP dam—Horseshoe—which was built on the Verde River for water storage only. Of equal importance to the state in the long run were the innovations in the transfer of water and water rights that emerged from the project.

Phelps Dodge Corporation had been seeking additional water supplies for its giant Morenci mining operation on the Gila River watershed in southeastern Arizona since the 1930s.¹¹ It was feasible to pump water out of the Black River on the Salt River system through a relatively short pipeline into the upper reaches of the Gila system. However, SRP would contest any diversion from the Salt River watershed unless a new source of water replaced it.¹²



Horseshoe Dam, early construction site, 1944

Phelps Dodge proposed to compensate for diverting from the Black River by building a new dam at the Horseshoe site on the Verde River that would store an additional 60,000 acre-feet of floodwater. As a war-industry project, the federal Defense Plant Corporation would finance the dam, while Phelps Dodge footed the bill. In exchange for paying for the dam, Phelps Dodge received a water credit totaling 250,000 acre-feet, allowing the company to pump water out of the Black River at a rate not to exceed 14,000 acre-feet per year. This arrangement provided a legal framework for Phelps Dodge's use of water from the Salt River basin.¹³

When they approved this arrangement in November 1943, the Board of Governors thought that enlarging SRP's storage system on the Verde would eliminate the last vestige of competition for Verde water.¹⁴ However, when word spread that Phelps Dodge and SRP were negotiating a contract to build Horseshoe Dam, Senator Ernest McFarland received a number of protests from other Valley water interests. As a result, the senator pressed for an expanded Horseshoe Dam to solve the water supply problems of the Buckeye Irrigation Company (BIC), RWCD, and RID.¹⁵

The USBR quickly took up this idea and within a month had outlined its own plan to "settle the controversy raging in central Arizona over the waters of the Verde River" by building a much larger dam at the Horseshoe site. Phelps Dodge would fund the expanded dam to the cost of the original project, while the federal government covered the remainder. Irrigation

districts that received the water would reimburse these costs over time.¹⁶ However, the USBR was unable to implement this plan, and construction progressed under the original arrangement between SRP and Phelps Dodge.

Construction on the dam began in 1944 and continued into early 1946. Horseshoe Dam is the only earth and rockfill dam on SRP's system, a decision made because of the wartime labor shortage and the remote location of the dam. The Association's engineers felt that a concrete dam would be too costly, particularly given the cost of cement.¹⁷ In 1946, the Association signed an agreement with the City of Phoenix to increase the storage capacity of the dam by building new spillway gates. The city agreed to pay for the gates in exchange for a portion of the water stored in the reservoir. Construction on the massive Tainter gates, completed in 1951, increased the storage capacity of Horseshoe Dam from 67,000 acre-feet to more than 139,000 acre-feet.¹⁸



Aerial view of Horseshoe Dam, May 1964

SRP'S MODERN STRUCTURE

At the same time that SRP negotiated the control and purposes of Horseshoe Dam, a dispute with the federal government over SRP's tax status emerged. In 1941, the Bureau of Internal Revenue (BIR), predecessor to the Internal Revenue Service, found the Association to be delinquent in tax payments for 1936 through 1938 and presented the Association with a bill for \$348,000 in taxes and penalties.¹⁹

This substantial back payment was the result of a BIR change to the status of SRP power operations. Throughout its history, SRP maintained the policies and protocols established by the USRS prior to 1917 when power and irrigation operations were treated as a unit. For two decades, the Treasury Department had tacitly agreed with this representation of SRP interests, and did so when the Association submitted tax records for the 1936 and 1937 tax years. By 1941, however, the BIR had altered its position. It claimed that the power and water functions of SRP were separate and that the entire net revenue of the power division was taxable income, including revenues used to pay the costs of the water system.²⁰ With the creation of the District in 1937, SRP's tax status changed. In protesting the BIR charges, SRP legal counsel argued that the Association held no property of its own and turned over any revenues it received to the District, which was a tax-exempt political subdivision of the State of Arizona.

In the midst of the tax issue, the USBR made an offer to take over the SRP electrical system

with the aim of creating a regional federal power system. The proposal included a provision releasing SRP from any outstanding taxes. SRP officials tentatively approved this deal primarily to escape the impending tax burden—the US Tax Court had placed the SRP case in the limbo of its reserve calendar.²¹ In the words of Orme, “this condition rode along from September 1944 to sometime in 1947, when we got word from Secretary Krug, who had replaced Secretary Ickes, that he did not believe the Bureau of Reclamation could go through with the proposal.”²²

Following this reversal, SRP and the BIR reopened negotiations on the tax matter in April 1949. SRP attorneys persuaded the government to accept the SRP position that the organization’s tax status had changed in 1937 when the Association transferred most of its assets and obligations to the District. The government accepted this argument, and all that remained of the tax liability were arrears prior to 1937, originally estimated at \$348,000.²³ SRP proposed a waiver for capital stock taxes and interest already paid for the period yielding a total payment of \$100,000. The US Treasury Department approved the compromise.²⁴

In 1949, the District and the Association amended the 1937 contract to formalize this arrangement. The Association continued to exist as an agent of the District and was responsible for operating the irrigation system, collecting assessments, and paying the federal construction costs.²⁵ The District took on the direct operation of the power system. This agreement solidified SRP’s current structure and still governs the relationship between the two entities. This was another important step in the development of SRP’s unique status—a combination of corporate, municipal, state, and federal powers, duties, and obligations.

THE INTERNATIONAL BROTHERHOOD OF ELECTRICAL WORKERS

The Great Depression and the social reforms of the New Deal changed America dramatically and permanently. One of the most significant developments was the rapid evolution of attitudes toward labor unions. In a series of Supreme Court decisions and congressional acts from 1930–37, workers gained the right to organize industrial and service unions, and new regulations regarding the relationship between workers and management emerged. In 1937, the International Brotherhood of Electrical Workers (IBEW) began its attempt to organize SRP’s hourly workers. Ever wary of increased costs, SRP management considered a union unnecessary. Despite this, President Orme signed a notice that recognized the right of employees to self-organize as stipulated in the National Labor Relations Act. The same letter also stated that unapproved solicitation on behalf of the union on company property would result in termination.²⁶

There was no question SRP shareholders were solidly behind this position. Valley farmers were concerned about the type of violent confrontations and radicalism they perceived to be part of the labor movement.²⁷ Farmers organized the Associated Farmers of Maricopa County specifically to maintain an open shop for agricultural workers while the IBEW continued its organizing efforts. At a special meeting on August 20, 1940, the fledgling labor organization

was presented with its charter and was designated IBEW Local No. B-266.²⁸ Initially organized by electrical workers and designed to represent only qualified employees from the electric power department, Local B-266 soon became a mixed union open to all hourly workers. This increased its bargaining power and prevented the entry of another union for clerical or unskilled workers.²⁹

SRP claimed that, as an “instrumentality of the government,” it was not subject to most labor laws that regulated private corporations.³⁰ IBEW organizers were convinced that SRP was trying to take advantage of its relationship with the government.³¹ The first attempts at communication between the new union’s representatives and SRP management were difficult.³² Nevertheless, change was imminent, and in January 1941, a proposed contract was approved by Local B-266 and presented to SRP leadership.

The SRP board met in a special session in February and shareholders attended in large numbers. Fearful of increased assessments, the shareholders voiced strong opposition to an employees’ union. The farmers volunteered to “run the water themselves” if there was any trouble.³³ Cecil H. Miller, president of the Arizona Farm Bureau Federation, urged united action to resist unionization of SRP. “Agriculture has no fight with organized labor but at present we have no income comparable with that of industry and labor. Until the time comes when we are on an equal earning level . . . we must defend our position.”³⁴ In June of 1941, the National Labor Relations Board ruled that SRP was subject to labor laws.³⁵

At a referendum election in July 1941, SRP employees voted 473 to 51 in favor of unionizing and elected IBEW as their bargaining agent.³⁶ Negotiations over the contract took place in the summer and fall of 1941. For a time, a strike appeared imminent, but many union members were keenly aware that this first labor agreement likely would not satisfy all their expectations. One member of the hydrographic department expressed to the membership his hope that patience and perseverance would ultimately gain the consideration they sought.³⁷ Union officials were ultimately successful in ratifying a contract. Association and IBEW officials signed the first labor contract October 10, 1941. The contract was a “continuing agreement,” meaning it remained in effect from year to year unless either party gave a sixty-day notice prior to the anniversary date that it desired to renegotiate the contract.

Wartime prosperity and a labor shortage reduced the likelihood of confrontations, but SRP hourly workers now had a mechanism to negotiate for increased pay and improved working conditions. In a series of administrative and judicial actions, SRP workers gained the right to overtime pay and benefits. By the end of 1945, SRP had implemented a forty-hour workweek for all hourly workers except *zanjeros*, in keeping with the national trend toward a shorter workweek to reduce unemployment during the postwar period. In the same year, SRP and the union for the first time agreed to a labor contract extension without the need for arbitration.³⁸

The developments in power and water during the prewar and wartime period laid the foundation of a new era that would change SRP and the Valley immeasurably. Efforts to

expand SRP's generation portfolio in the late 1930s marked the beginning of a key principle in maintaining a reliable, affordable power supply for the Valley—a diverse power generation fleet. This concept continues to be an important component in SRP's resource planning. Horseshoe Dam increased water storage on the Verde River, but the concept of water exchange which enabled its construction also remained a critical component in Arizona's continued development. The income tax dispute resulted in the formalization of SRP's modern structure, and the 1949 amendment to the contract between the Association and the District, still in effect today, clarified the relationship between the two entities that make up SRP. The unionization of its workforce began SRP's transformation from a farmers' auxiliary to an urban service organization and continued the evolution of a distinct corporate culture. Looking forward, continued growth and change would define SRP's future. The work of delivering power and water was no longer a simple operation; it demanded creativity, intelligence, diplomacy, flexibility, and collaboration—all skills and talents the new wave of SRP leaders and workers honed in the coming decades.



CHAPTER EIGHT:

THE PRUNEPICKERS

In the decades following World War II, the Salt River Valley experienced a wave of social and economic change as the agricultural community underwent rapid urbanization. Hundreds of thousands of migrants moved westward to the Phoenix metropolitan area, energized by the possibilities of a dynamic and growing city. These new arrivals faced a promising future that looked very different from the world they left behind.

The Valley community that welcomed them supported expansive development, embraced new ideas, and offered new beginnings for the incoming settlers. Residential neighborhoods sprang up, seemingly overnight, complete with the modern conveniences of air conditioning and built-in electric appliances. Schools overflowed, unable to keep up with the growing number of students. The new arrivals eagerly embraced the outdoor lifestyle and abundant recreational opportunities of their new home.

SRP was integral to these changes, supplying creative, forward-thinking ideas and technological advances, but not without challenges. As in the past, it struggled to find the best possible balance between too much or too little change. Building on lessons learned from experience, its strong foundation ensured a solid future for SRP and the people it served.

GROWTH

In 1943, the Phoenix metropolitan area was booming as its economy rose to the task of supporting the war. Two new US Air Force bases had been opened in the Valley, Arizona copper mines were producing at full capacity, and crop prices were high. However, war conditions also meant a shortage

of both workers and materials for all but minimal improvements. Many among the SRP leadership remembered the strong economy during World War I, which suddenly reversed in the postwar years as a crushing agricultural depression nearly sank the organization because the shareholders were unable to pay their assessments. Consequently, SRP used surpluses to prepay three years on the original construction debt and sought additional opportunities “to create a cushion” for the years immediately following the war. This prudent financial planning, luckily, turned out not to be necessary.¹

Determined to avoid a postwar slump, the federal government implemented transitional economic programs soon after the war ended. One of the important programs for Arizona offered emergency housing for veterans, which helped fuel a statewide building boom. In the Valley, spectacular economic growth quickly rewrote projections for the future. “Postwar conditions in the area have become amazing,” SRP General Superintendent H. J. Lawson wrote in 1945. “The closing of war production industrial plants caused no economic slump and no serious unemployment. Instead, the influx of people continued. . . . Many hundreds of acres of farm lands are being subdivided and homes are being built thereon.”² In 1948 alone, with new subdivision development on the rise, the number of SRP residential customers increased a record 28.5 percent. While agricultural production remained healthy, the area’s economy began to diversify. Thousands of new businesses opened each year to meet growing demand, including manufacturing enterprises in converted war plant facilities.³

Across the Valley, the rapid shift from a wartime economy to a peacetime boom soon created a sense of possibility. Phoenix was coming into its own as a city, both economically and politically. Rejuvenated by the completion of a series of power dams on the Colorado River, which provided a major new power source to Arizona, the USBR began making plans for its next big undertaking: the Central Arizona Project, which would bring 1.8 million acre-feet of Colorado River water to central and southern Arizona. These new water and power assets would help fuel more and bigger opportunities for economic development in Arizona.

By mid-century, political, business, and professional leaders, the same groups that had united the Valley in its pursuit of Roosevelt Dam fifty years before, began to aggressively promote the development of the newly branded “Valley of the Sun.” The goal this time was to attract new industry and commerce to create a balanced—and much larger—economy. The emerging electronics and aerospace industries established plants across the metropolitan area, beginning with Motorola, which was soon joined by Honeywell, General Electric, Goodyear Aircraft, Sperry Rand, and others.⁴

In the face of this relentless growth, SRP recognized the need for its core business practices to adapt accordingly. A new generation of leaders embraced an expansionist view of the company’s role. As urbanization took off, SRP became, like its customers and the Valley itself, more business-oriented and metropolitan. In 1950, the cover of the company’s annual report for the first time used the name “Salt River Project” rather than “Salt River Valley Water

Users' Association." Inside, the breakdown of power revenue referred to residential sales as "domestic customers" rather than "rural domestic customers"—perhaps a tiny detail in a corporate publication, but one that signified a fundamental change in attitude.⁵

As President Orme and General Superintendent Lawson neared the end of their SRP careers, it was increasingly clear that the scale and rapidity of change in postwar Phoenix was going to be more spectacular than they or anyone else could have imagined. The task of expanding and modernizing SRP would shift to a group of young managers and engineers—a new generation that would oversee the change from a rural water users association to an urban power and water provider.

DROUGHT AND GROUNDWATER

Not all the news in post-war Arizona was good, however. A severe drought lasted through the entire decade of the 1940s into 1952 and had important implications for the availability of electricity, since SRP hydropower dams were still a key source of generation for central Arizona. Without hydroelectricity in the resource mix, an already strained power base meant shortages and long blackouts in response to ever-growing customer needs. Irrigation pumps, heavily utilized during times of drought, were shut off during peak power usage periods. Since agriculture, dependent on the groundwater supply, was still the largest and most important industry in the Valley, this was cause for considerable consternation.

Others shared similar water concerns. Central Arizona city officials, while celebrating their booming population growth, warned that existing municipal water systems would soon be inadequate without large-scale construction efforts for the necessary transmission and delivery infrastructure.⁶ At the same time, state officials predicted an impending "dust bowl" if steps were not taken to control "the indiscriminate pumping of a rapidly depleting underground water supply."⁷ By the late 1940s, the groundwater crisis was the most serious the state had yet seen. The water table under SRP lands was dropping by as much as six feet a year, and those lands were not even the most heavily pumped in the Valley.⁸ As high agricultural prices continued after the war ended, more and more desert had been plowed up for farms, and these newly cultivated lands were entirely dependent on groundwater for irrigation. The fear was that increased pumping would lead to ever-lowering water tables and ever-increasing pumping costs that might drive existing farms out of business.

Unlike surface water, groundwater was largely unstudied, and little was known about how much was available or how much was being pumped. In addition, determining the border between groundwater and surface water was a difficult task with no easy technical solution. The Arizona Supreme Court had provided guidance on the matter of wells pumping near streams, allowing for appropriation of water pumped from an underground stream or from areas adjacent to and connected with an aboveground river. Percolating groundwater in basins, on the other hand, was not regulated by the state—whoever had the deepest and

largest well could pump water as needed, regardless of the effect on neighboring wells. In 1945, the Arizona Legislature passed a law requiring the registration of all wells with the State Land Department and appropriated money for groundwater research but left other problems unaddressed: nothing was done to regulate wells or redefine the legal status of groundwater.⁹

The 1945 groundwater law was passed in response to pressure from the USBR to more strictly regulate groundwater use as a condition for construction of the CAP. “The people of Arizona must discipline themselves in the use of the remaining water,” warned Reclamation Commissioner Michael Straus. He cited the example of farmers in the San Joaquin Valley who had drained the water table down to 1,000 feet and now depended on the Central Valley Project to bring them water from 500 miles away.¹⁰ Arizona Governor Sidney Osborn was strongly in favor of a groundwater code that would restrict pumping in critical areas to a sustainable yield; that is, an amount that would result in no net lowering of the water table over the long term. SRP, the major newspapers, and *Arizona Farmer* magazine, which spoke for established agricultural interests, supported this position. Osborn was an activist and New Deal Democrat, while the state legislature, though Democrat-controlled, was much more conservative. There was no consensus on what kind of regulation should be imposed or the much more prickly issue of whether groundwater should be subject to appropriation, rather than being shared equally among all users or simply pumped by those who could afford to extract it until it was gone.¹¹

The result of these uncertainties was a stalemate. When the legislature for the third year in a row declined to pass a groundwater code, Osborn called three special sessions specifically to address groundwater legislation, finally resulting in the Groundwater Code of 1948.¹² Unfortunately, beyond the political realm, this first act did very little to actually solve the long-term problem of groundwater depletion. Clearly frustrated, one representative suggested the new legislation was “as weak as restaurant soup.”¹³ A lawsuit based on this act (*Bristor v. Cheatham*) led to an Arizona Supreme Court ruling extending the appropriation principle to groundwater.¹⁴ This ruling would have been a historic assertion of public control over property rights except that a year later the court reversed itself, in effect allowing the laissez-faire approach to continue.¹⁵

Groundwater was only part of the SRP farmers’ water supply, but starting in 1941, the annual draft on stored water often exceeded intake, steadily lowering the reservoirs. Then came the disastrous years of 1946 and 1947, when a near-total drought drew the reservoirs down below 300,000 acre-feet, the lowest level since 1940. SRP had more than 200 irrigation wells, and groundwater was mixed with river water as needed to supplement the supply. Sixty thousand acres of SRP land also qualified for a special “pump rights” program instituted in 1929 because the owners of those lands had contributed to the construction of new pumps. In 1947, SRP management recommended ending the pump rights program as a way to halt groundwater overdraft. The legal implications of such a move, however, were far-reaching and difficult to resolve quickly while the water crisis was real and immediate. The Association Board of Governors received requests from citrus grove owners to expand the pumping

program and from other shareholders wanting to borrow from the coming year's water allotment.¹⁶ With little chance of developing a comprehensive policy before the 1948 SRP election, the board took no action on management's recommendation.¹⁷

DICK SEARLES TAKES CHARGE

After fourteen years as president, Lin Orme declined to run for re-election in 1948, and it appeared that a spirited election campaign was in the offing. Orme's handpicked successor was former SRP Secretary Fred Henshaw, but opposing shareholders declared their dissatisfaction with the current management regime, particularly on the issues of groundwater development and the per-acre assessment rate. This group advocated for more "economical management" and began looking for an alternative candidate to challenge Henshaw.¹⁸ They found him in Richard D. Searles, a Scottsdale rancher and state legislator who played a leading role in passing the 1948 Groundwater Code and whose outsider status and business acumen were features in his run for SRP President.¹⁹ The campaign was the most vigorous in years. As the *Arizona Times* said, "Basically, there is only one issue: Which candidate will do the most to aid the project's drought-ridden farmers, and how will he do it?"²⁰

The underlying issue of the election was the reassertion of a pro-growth, boosters view of the destiny of the Valley, a view that had held sway in the 1920s but which had been out of favor since 1930. Agriculture was still the leading industry in the area, but the fiscal conservatism that had characterized the Orme administration—appropriate and even unavoidable during the Depression and war years—had left the SRP power and water systems in disrepair. Searles' candidacy was motivated by what he and others viewed as unresponsiveness on the part of SRP power and water services to the day-to-day operational needs of customers and shareholders. Customers experienced persistent delays in receiving power, and the water delivery system was so inefficient that one of Henshaw's campaign proposals was to cut down what he called a 40 percent loss of water to seepage and leakage in the canal and lateral system.²¹

An exchange between the two presidential candidates the night before the election showed their philosophical differences. In response to a question about an offer from the USBR to buy the SRP power network as part of the negotiations over the Association's tax liability, Henshaw employed a horse-trading metaphor: "If you get the right kind of deal, sell the horse." Searles retorted, "If you've got a good horse, you had better keep it and feed it, and let it feed you."²² The responses exemplified the differing views of the two factions. Searles made it clear that he represented necessary internal changes, and in the election he claimed a decisive victory and a mandate for his vision. One headline read, "Searles Says He'll Oust Old Regime."²³

Searles was president of SRVWUA for only three years (1948–51) before resigning to serve as the United States Undersecretary of the Interior. Nevertheless, as SRP historian Paul Weimann noted, "Searles probably accomplished as much in three years as any other president, no matter how long he served."²⁴ Searles sought to expand and modernize the power system

and to change the system frequency from 25 cycles to the modern standard of 60 cycles, which was better suited for household appliances and lighting. He also wanted to overhaul the irrigation system, many parts of which had not been improved since their original construction in the 1910s. Searles pushed for modern maintenance methods, communications and safety improvements, as well as the addition of a power marketing department to build load and increase revenue.²⁵ One of his first acts was symbolic—he bought new steel office furniture to replace the solid oak chairs and roll-top desks that had been inherited from the USRS in 1917.²⁶

Searles and the SRP board believed that an infusion of new managerial talent was needed to fully accomplish the ambitious modernization program. In 1947, upon General Superintendent Lawson's retirement, O. L. (Tex) Norman was hired and given the new title of General Manager. Norman was a complete outsider, a wartime naval commander brought in to shape up SRP. He attempted to lead by authority and persuasion, writing long essays every month for the company newsletter in which he instructed and cajoled employees to adopt new practices and attitudes.

However, Norman was attempting to lead a company that had a long history of doing things a certain way. At that time, the SRP workforce included a significant number of older workers of long tenure; it was not unusual for workers to remain with the company into their seventies or eighties. After a year on the job, a frustrated Norman wrote in the *Current News* that SRP “has a tendency to be set in its ways . . . we must get more ‘zip’ into the organization and progress.”²⁷

THE PRUNEPICKER GANG

Taking office in May 1948, Searles agreed. In order to accomplish his ambitious agenda, SRP would have to look outside its walls for new talent. Coincidentally, Southern California Edison Company (SCE) was wrapping up a large-scale program of modernization and frequency unification. SRP reached out to the California utility in hopes of finding a wide range of qualified workers interested in moving to Phoenix: technicians, but also managers and chief engineers in both the water and power divisions. During the fall, groups of men from SCE visited the Valley and learned more about SRP.²⁸

By the end of the year, SRP had hired a cadre of talented and ambitious young engineers. Roderick J. “Rod” McMullin was hired as manager of irrigation, and Stan Ward was appointed manager of power. Tom Morong and Henry Shipley became the new chief engineers of power and water, respectively, and Glen Brandow became superintendent of power operations. Vaughn Pierce, another important newcomer, was hired to work under Ward for several years as what he fondly called a “glorified stooge” until he became the manager of industrial relations, overseeing important functions including labor relations, training, advertising, public relations, and communications—all new departments at SRP.²⁹ A few years later, Les Alexander joined the group. A former power marketing manager for the USBR, Alexander would become a key strategist in the expansion of the SRP power business. Greig Scott retired

as SRP outside counsel and that role was accepted by the firm of Jennings, Strouss, Salmon & Trask (later Jennings, Strouss & Salmon or JSS).

One of the reasons the Californians came as a group was their observation that Norman, another outsider, had been ineffective in his efforts to institute change. McMullin recalled the situation:

Tex arrived at the Project alone. In those days, we were down at Second Avenue and Van Buren, with the executive offices in the basement of the building, with an outside entrance to the basement. That's where the boardroom was, and Tex was lodged down in that basement, overwhelmed with paper and administrative decisions, and trying to get order into the Salt River Project's operations . . . and he would issue orders. I could just see that those who didn't really share Tex Norman's views on what he wanted done walked out the door and that was the end of it. Tex never had time to get out there to see if it was ever done. And that was part of our arrangement in coming—why we wanted to come as a team.³⁰

As part of the reorganization mandated by the 1949 income tax settlement, the SRPAIPD took over the direct operation of the SRP power system while the Water Users' Association continued to operate the irrigation system. A number of employees transferred from the Association to the District, and Ward and McMullin were appointed general managers of the District and the Association, replacing Norman.³¹

As anticipated, there was some employee resistance to the change of top management. McMullin recalled that at the time the new leadership arrived in the Valley, the long fight for Colorado River water was at an especially contentious stage, and many saw the new arrivals as an invasion from the West Coast. "We were referred to as 'spies' and 'interlopers' and 'invaders,'" he recalled.³² The group of new managers was dubbed "the prunepickers," a Depression-era term for Californians. Resistance to the "prunepickers" management waned slowly as they built trust with existing employees and a tide of newcomers joined a growing SRP. In 1949 and 1950, more than 500 new employees were hired, a substantial increase for a company that had barely more than 1,000 people on the payroll in 1946. There was some staff turnover, aided by a new mandatory retirement age and the adoption of a pension plan. Most of the newcomers, though, were workforce additions needed for new programs, and over time, most employees realized that the new management team was "fighting the problem and not the people."³³

REBUILDING THE POWER SYSTEM

In the face of the post-WWII population boom, it was quite clear that the SRP power system needed modernization and overhaul. During the years of the Depression and war, SRP built

its first thermal generating plant and began to receive power from the USBR's Colorado River dams. Nevertheless, SRP lacked sufficient generating capacity to meet the projected increase in load, and the electrical distribution system, designed to serve scattered farms and wells, was wholly inadequate for the concentration of homes and businesses popping up in the once-cultivated fields. But before those serious problems could be addressed, a more basic one had to be resolved—SRP made the wrong kind of electricity.

When SRP began generating electricity at Roosevelt Dam in 1909, the biggest markets for its power were private agricultural wells in the Valley and the mines and smelters of Miami, Superior, and other Arizona copper towns. For these purposes, 25-cycle power was ideal, but for lighting and other urban uses, the electric industry had established 60-cycle power as the standard. Through the 1930s and 1940s, electric utilities nationwide adopted the 60-cycle standard and invested in the necessary equipment. SRP lagged behind in this regard, so when it began providing domestic power to farms after 1928, its customers had to buy appliances that were modified to accept 25-cycle frequency.

SRP management began converting parts of the system when the first 60-cycle power arrived from Hoover and Parker Dams in 1940. The war delayed efforts to change the system frequency, but postwar growth in the Valley made the problem acute. SRP added new 25-cycle connections at the rate of seven to ten each day, and much of this investment in equipment would have to be duplicated with the inevitable arrival of conversion.³⁴ In 1947, the SRP board acted to finance the changeover and, by the end of 1948, General Manager Norman was satisfied that the modernization of the power system was proceeding smoothly.³⁵ SRP converted more than 3,000 customers to 60-cycle power, and the backlog of new service orders was reduced from 1,100 to “such a status that no one was inconvenienced by having to wait for service beyond a reasonable period,” Norman said. With “a few additional replacements of worn out equipment,” he felt SRP would have substantially solved its power problems.³⁶

The new management group accelerated the frequency conversion program and established a special conversion department that loaned equipment and offered appliance trade-ins to customers. By the end of 1950, the frequency conversion was 95 percent complete. The hydropower dams on the Salt River, however, continued to produce 25-cycle power for the mines, which had no desire to convert their equipment.³⁷

While working on the frequency changeover, the power department had to address other issues. The electrical system of SRP, like that of the entire state, suffered from frequent and severe power outages, some of which even echoed through the interstate system, causing equipment failures in California. “A real strung out, baling wire system,” as Tom Morong called it.³⁸ To serve the increasing number of residential and commercial customers, SRP built a new grid of high-voltage transmission lines and substations across its service area. The benefits of the new system were immediate. Power outages decreased, low-voltage problems disappeared, and the upgrades proved their worth by saving money via improved efficiency. The improved

reliability also helped SRP take advantage of significant added capacity: in mid-1951, the USBR's second high-voltage power line from the Colorado River was completed.³⁹

REHABILITATING THE WATER SYSTEM

The same population growth that spurred renovation of the power system necessitated an overhaul of the water system as well. As the influx of newcomers grew and cities spread into formerly irrigated farmland, it became obvious that the extensive ditch system complicated urban living. Ditches blocked traffic and street drainage, attracted litter, occasionally overflowed, and encouraged the growth of weeds. The canals also could be hazardous as increased population and new land uses arrived on their banks. The deceptively powerful currents of the moving water presented a potential danger to vehicles and pedestrians, especially children. While it was cost-prohibitive and impractical to pave over the many hundreds of miles of canals, laterals, and ditches, SRP did begin an effort to pipe and underground waterways where possible. A joint effort with developers to pipe ditches near subdivisions was a major focus.⁴⁰

Beyond the challenges brought about by urbanization, there were plenty of other reasons to upgrade the irrigation system. Almost all the canals and most of the lateral system were unlined dirt, so they were prone to erosion and leakage and required constant maintenance to prevent weed growth and damage from burrowing animals. The biggest problem with dirt ditches, however, was seepage, which caused the loss of up to a quarter of the water diverted at Granite Reef. Many of the gates and weirs in the ditches were the original redwood structures built decades earlier during the initial construction phase. Even in the best of conditions, these structures leaked freely, decreasing their efficiency and reliability. SRP initiated a system-wide renovation, and by 1948 two-thirds of the 3,000 wooden water control facilities were replaced with concrete structures. Budget projections indicated, however, that without a new source of funding, replacement of the irrigation facilities would do little more than keep pace with obsolescence.⁴¹

Other reclamation projects faced similar problems, and they united to seek help from the federal government. Under the Rehabilitation and Betterment Act of October 7, 1949, Congress authorized interest-free loans to reclamation projects for the improvement of irrigation facilities. In March 1950, the Association signed the first of a series of contracts that would ultimately provide \$30 million in improvement funds. By 1954, seven miles of canals and forty-three miles of laterals had been lined with concrete, and another twenty-eight miles of ditches had been piped. The cost of piping ditches, which averaged more than \$40,000 per mile, was usually shared with cities or the county as part of road construction projects, as piping allowed the street to be widened over a lateral.⁴²

The rehabilitation and betterment program at SRP reinvigorated the company's tradition of innovative engineering. SRP engineers scoured the West for solutions to the technical



Cast-in-place concrete pipe installation, 1963



Gunite application on the Arizona Canal, 1967



Slipform installation, 1968

problems they faced. They discovered the Fullerform process, developed by a California company, to make a continuous-poured, V-shaped concrete ditch for use in rural areas. Sprayed-on masonry products such as shotcrete or gunite were ideal for some ditches and the sides of large canals. For urbanizing areas, ditches needed to be piped, or “tiled.” The process was very expensive when precast pipe was used, so in 1955, SRP imported another technology developed by Fullerform for continuously poured, cast-in-place concrete pipe, which allowed the work to proceed much more quickly. SRP designers and engineers developed a new type of

control gate for laterals, which reduced leakage and provided more accurate water measurements. Eventually, SRP manufactured more than 5,000 of these gates. Tours of other reclamation projects also led to the development of remotely operated water control structures by the early 1960s.⁴³

A NEW KIND OF ZANJERO

Changes to the Valley’s water infrastructure also meant changes to the labor required to operate it. For nearly a century, the system had been in the hands of zanjeros, or ditch riders, who operated

the gates that brought water from the canal to the farm. Zanjeros also took water orders and calculated the amounts used by each farmer, which was important for determining water balances and assessments. When all the individual canal companies were incorporated into SRP in the early 1900s, the newly unified irrigation system was organized into fifty-two divisions, each under the control of a single zanjero. General Manager McMullin later recalled the vast responsibility each worker possessed: “They carried the books in their hip pocket. They controlled the water. They took the water at the headgate, parceled that water out, sent in the charges, and they were king of their division.”⁴⁴ The zanjeros’ lives could be demanding, however. Although they lived in family houses provided by SRP and enjoyed a close and cooperative relationship with farmers, they were on call twenty-four hours a day. During the summer irrigation season,

they worked around the clock. Their wives were often considered part of a two-person team, supporting the water delivery process by taking phone orders and complaints, tracking delivery data, making out charge cards, and keeping credit balances on the accounts.⁴⁵

The *zanjeros* were salaried employees, and in 1945 they sued for overtime wages and won \$80,000 collectively in back pay.⁴⁶ After that, *zanjeros*' wages were calculated on a new system, which allocated a unit of time for each job performed by the *zanjero* and allowed overtime pay.⁴⁷ Then in the fall of 1950, the *zanjeros* and their wives—who had previously been uncompensated for their labor—filed two new suits

seeking back pay and damages. These suits became a turning point in SRP's history. Within two months of the lawsuit filing, an entirely new plan was developed to replace the traditional *zanjero* system. Beyond the issues at stake in the suit, the decentralization of control and lack of supervision in the existing system were unacceptable to the more modern managers running SRP at the time. The new plan was a "zone system" whereby irrigation delivery became a shift job handled by a rotation of *zanjeros* in radio cars working out of field offices. A more centralized, formal system was created in which the *zanjero*, renamed a "water diverter," had no responsibility for taking the order or recording it.⁴⁸

Because this new design changed their personal connection with the *zanjero*, it faced strong opposition from the farmers—despite the fact that as SRP shareholders they would pay for any increased earnings or damages won by the *zanjeros*. "Ohhh, bitter resistance," McMullin recalled. "Resistance that called for farm meetings out in hay barns. I'd go to these meetings, and I want to tell you, I'd back up to a bale of hay, because I wasn't sure who was behind me!" The negative stereotype of the prunepicker surfaced again. McMullin remembered, "The farmers saw these Californians in here imposing this whole thing and upsetting the whole thing . . . and instead defended their individual *zanjero* that they wanted to work that district twenty-four hours a day."⁴⁹

Whether due to the resistance or faulty design, the new system did not work. Spurred by the continuing discontent, McMullin went back to the drawing board. "I went home that night and sat down with maps and devised an entirely new system that would keep the people on the divisions." McMullin's new system kept the field offices and the communications and reporting structure but put *zanjeros* back in their divisions on twelve-hour shifts. This maintained the familiar relationship farmers valued while increasing management's oversight. The compromise demonstrated the complexity of the challenges of urbanization and SRP's need to preserve some continuity even as it moved into a new era.⁵⁰



Zanjero house,
September 1951



Employees working on the site of the PERA Club, including the swimming pool, 1953



Summer days at the PERA Watermelon Bust, 1964

A CHANGING CULTURE

While giving up the old ways was difficult for some, positive aspects of the company culture helped ease the process of SRP's modernization. A paternal, family atmosphere was simply a way of life. Zanjeros, gatekeepers, dam tenders, and most of the Yaqui maintenance crew lived in SRP-owned houses, and many employees shopped at the company commissary. Company picnics, dances, and other social events were heavily attended. There were softball and basketball teams and group hunting and fishing trips. Led by Editor

Nina Duncan, the *Current News* welcomed newcomers and urged co-workers to do the same. "Make the new ones feel that they 'belong,'" Duncan wrote in the April 1949 issue. "Remember when YOU were new."⁵¹ The "prunepickers" enthusiastically embraced this aspect of SRP and joined in the many all-company events at the Project Employees' Recreation Association Club, or PERA Club.

While painful at times, the modernization of the zanjero and other systems were part of management's strategy to professionalize the entire workforce. A 1951 job evaluation directed by McKinsey & Company involved management and employee committees in the first systematic attempt to classify jobs and compare wages with similar organizations throughout the West. As a result, management was able to present top-level wage offers to employees, and labor relations improved markedly.⁵³

Conditions improved for female employees too. Women had long been part of the workforce as secretaries, clerks, and telephone operators, but other jobs were not available to them. Then, in 1947, twenty-one-year-old Louisa Simons became the first female engineer at SRP after graduating with honors from the University of Arizona.⁵⁴ Slowly, SRP women found opportunities to advance into management in newly created departments, such as employee training, benefits, public relations, and data processing. Others took on leadership responsibilities working on committees for PERA or heading campaigns to increase employee purchases of US savings bonds and contributions to the new Employee Boosters Association (EBA), formed in 1951.⁵⁵ EBA built on a tradition of active community service and philanthropic support at SRP, including blood drives, scrap metal

PERA

In 1951, a group of around 500 SRP employees headed by Dan Boone, the club's first president, formed PERA (Project Employees' Recreation Association), a nonprofit organization, to provide a place where employees and their families could relax and have fun. A year later, SRP and PERA signed a lease agreement for the use of 84 acres just off the Crosscut Canal.

Employees pitched in to clear the area of rocks, trees, and heavy undergrowth and then spent countless hours of their own time building the facilities. Construction began in June 1952 and the facility was open and in use (including the swimming pool) the following summer. The ambitious improvement schedule continued, and within ten years PERA boasted ramadas, picnic tables, a baseball diamond, and a two-story clubhouse.

In the succeeding decades, PERA added to its facilities and grew to more than 4,000 members (full-time employees and their spouses), who enjoyed the many amenities as well as a variety of events, including sports tournaments, barbecues, and holiday parties.⁵²

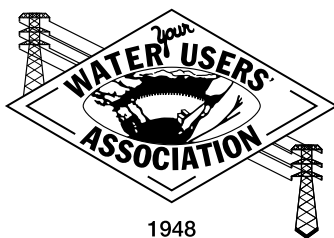
collections, and support for the local Red Feather Fund (a predecessor of the United Way). Nearly 400 employees, eager to work collectively in support of local needs, immediately joined the new organization, which grew with SRP both in membership and donations.⁵⁶

The postwar years in the Valley witnessed a remarkable influx of families and businesses that settled across a vast landscape once marked by cultivated fields. It was a period when confidence was high, change was in the air, and many aspects of community life were being re-imagined. SRP successfully navigated the first flush of postwar growth and substantially remade itself in response to the many challenges. Modernization took hold of the organization as the water and power systems underwent major improvements with plans for continued development. Simultaneously, organizational changes reframed the corporate structure and built a new corporate culture under the leadership of the “prunepickers.”



Celebrating another successful EBA campaign, 1964

As if to commemorate its forward-looking new identity, in 1957 SRP moved its administrative offices from the “Water Temple” in downtown Phoenix (the former USRS headquarters, built circa 1910) to the new Project Administration Building in Papago Park on a new street named Project Drive. Ward had resigned as the head of the District and McMullin took over as general manager of both the Association and the District. This was the beginning of the integration of the two organizations on every level except legally. The Salt River Valley Water Users’ Association continued to operate the reclamation project and distribute irrigation water, and the Salt River Project Agricultural Improvement and Power District continued as a political subdivision under Arizona law with unified management. The same year the two organizations moved into the modern Project Administration Building in Tempe, they assumed a new, unified brand identity: Salt River Project, or SRP.



1948



1949



1956



1958



1958



CHAPTER NINE:

TERRITORIAL IMPERATIVES

Even as SRP took steps to modernize its water and power facilities, internal organizational structure, and culture after World War II, the external pressures of urbanization continued to build. SRP's essential geographic focus remained the same, but the nature of its service area was changing rapidly. As a consequence, SRP faced unexpected new challenges to its water and power territories. To meet them, SRP needed to maintain the water rights of its member lands while accommodating the burgeoning growth of cities on those lands. It also needed to protect the water supply from the vast watersheds that fed the Salt and Verde Rivers against upstream diversions and forest degradation. Concurrently, SRP had to safeguard its traditional electricity service territory from inroads by the City of Mesa and CALAPCO's successor, Arizona Public Service Company (APS), or risk losing the power business that had become the financial engine of the organization.

CITY WATER

In its early years, Phoenix relied on wells within the city limits for its drinking water supplies. By the 1920s, however, in response to increased demand and declining water quality, the city was forced to look for ways to supplement groundwater with surface water. Phoenix turned to the Verde River to meet its needs and built a system to pump water from beneath the river and convey it twenty-eight miles by pipeline to its municipal system.¹ Although its member lands held rights to the majority of the water from the Verde, SRP made no challenge to Phoenix's relatively small diversion. As attorney Ted Riggins explained, "The City merely 'used' the water without serious objection being

made by the Association or the shareholders of the Project.”² SRP already recognized that some 6,500 acres within the city limits were eligible for river water based on the townsite provisions in federal reclamation law. Additionally, there was no legal reason why the city had to rely on SRP to deliver the water. The water from the city’s Verde pumping plant, filtered by soaking through layers of sand, needed very little treatment for drinking, something that would not be true of water delivered through an SRP canal.

The situation remained unchanged as Phoenix grew slowly; even the near-tripling of the city’s water use from 7,500 to 19,500 acre-feet between 1922 and 1940 did not arouse much concern by SRP.³ Then Phoenix began to grow more rapidly. Between 1940 and 1950, the population of Phoenix almost doubled, placing an enormous strain on the city’s municipal water system, which the extended drought only exacerbated. Phoenix officials worked with SRP leadership to forge a long-term response to the water crisis. The 1946 agreement between SRP and the City of Phoenix (discussed in Chapter Seven) led to a \$1 million investment in new spillway gates on Horseshoe Dam, more than doubling the reservoir storage capacity.⁴ For its contribution to expanding water storage capacity, Phoenix received the right to accumulate up to 150,000 acre-feet of water in SRP reservoirs and to draw out a maximum of 25,000 acre-feet per year through its Verde River pumping plant.⁵

Unfortunately, drought conditions made it difficult for the city to abide by the 1946 agreement.⁶ There was simply no water flowing into the reservoirs and Phoenix had little choice but to pump more water at its Verde plant. SRP officials worried about the implications of this use as the combined water storage at all SRP reservoirs slipped below 250,000 acre-feet in late 1950. This amount translated into only one acre-foot available for each shareholder acre—about a third of the amount normally used in a year. Seldom had a wet winter been more needed than in 1950–51, but the drought continued relentlessly, and there was every indication that the coming summer could drain SRP lakes entirely.

When Phoenix officials unveiled plans in 1951 to expand the city’s water distribution facilities again, SRP management decided that the time had arrived to resolve its water issues with the city. While water rights were the central concern, SRP leaders also became frustrated over the increasing difficulty of collecting assessments from homeowners in new subdivisions. Farmland in SRP territory that was converted to subdivisions and annexed by the city still retained its water rights, and those new landowners were still obligated to pay SRP assessments for operation, maintenance, construction, and finance costs. However, because their water arrived via the municipal system instead of an irrigation ditch, many homeowners simply did not understand the reasons for the SRP assessments they received in the mail. Within Phoenix city limits alone, delinquent assessments and penalties by 1952 spread over thousands of accounts—a growing administrative nightmare. SRP could not terminate membership for the newly urbanized lands because the property served as collateral for its debt.⁷

Phoenix officials, however, did not share SRP’s sense of urgency, and so President Bill

Pickrell and General Manager McMullin decided a dramatic demonstration would elicit attention. Normally, SRP ran all of its summer irrigation water through the turbines of the hydroelectric dams along the Salt River to help with peak electrical load. At that time, there was also more water in the Salt system than in the Verde. On July 3, 1951, McMullin ordered dam operators to shut off releases from the Salt River dams and take all irrigation water from the Verde River system, which held only about 40,000 acre-feet. Given that normal irrigation releases totaled about 6,000 acre-feet per day, the calculation was that the Verde lakes would be dry in one week.⁸

Once McMullin confirmed that the switch was complete, he called reporter Ben Avery of the *Arizona Republic* to inform him that the Verde River would soon stop flowing past the city's Verde River pumping plant. Avery was aghast. The next morning the front page of the *Republic* declared that the city of Phoenix had only a one-week supply of water remaining. Even though the shortage was more a negotiating tactic than a genuine crisis, McMullin's demonstration nevertheless had the desired effect of demonstrating the strength of SRP's position. Within days, city leaders arrived at SRP offices early in the morning to open negotiations on a more comprehensive water agreement.⁹

The resulting twenty-five-year domestic water contract between Phoenix and SRP allowed the city, as an agent for the landowners, to receive all the water allocated to SRP member lands within the city limits for distribution to those lands and to assume responsibility for collecting and paying delinquent and future assessments. In other words, as Phoenix grew and annexed SRP member lands, it gained access to the same amount of water those lands would have received if they had remained farms.¹⁰ Under Arizona and federal water law, only those city areas which were SRP member lands could receive SRP water, so areas north of the Arizona Canal—the main area of the city's growth—still relied on other sources.

In time, nine more Valley cities signed similar domestic water contracts. The agreements also opened the way for SRP to deliver water directly to city water treatment plants situated along the canals. These contracts increased the supply available to cities and provided SRP with a way to manage the urbanization of its service area by providing water to new residents coming to live on former farmlands.

COUNTRY TO CITY

While the domestic water contracts recognized the advance of urbanization, the Valley in the middle of the twentieth century was still overwhelmingly an agricultural landscape. Like most US farmlands, the original survey of the area laid land out in one-square-mile sections of 640 acres each. Usually the SRP irrigation ditch, or lateral, ran along the section line with the county road running next to it. In fact, many Valley roads were identified by the numbering system on the SRP laterals that ran parallel to them prior to receiving official names: 35th Avenue, for example, was known as "Lateral 16" for a good part of the twentieth century.



Cottonwood trees line a lateral in the Salt River Valley, circa 1910.

The unlined dirt ditches provided an ideal habitat for water-loving cottonwood trees, some of which could reach a height of more than fifty feet in just a few years. The trees supplied early farms with fence posts and fuel for heat and cooking. In fact, a green cottonwood fence post near a ditch often sprouted into a tree. Floyd Wright, who rose from laborer to superintendent of construction and maintenance at SRP, described how when some trees were cut down, “you could find a staple once in a while in the center—and right in the middle of it you could see the post that was still there.”¹¹ As farmland converted to urban use,

ditches were piped or lined with concrete and roads were widened. The cottonwood trees, as a result, were removed or began to die off for lack of water.

Another distinctive rural feature that gradually disappeared during the 1950s was the traditional SRP well. By 1954, the rehabilitation and betterment program had paid for the re-drilling and refurbishment of more than 150 wells, making them much deeper and changing their pumps over to 60-cycle power.¹² They rendered obsolete the old well housing—a distinctive clapboard cottage with a wooden A-frame derrick projecting through the roof to facilitate removal of the pump for maintenance. With the development of mobile pump-pulling trucks, open-air pump motors inside a small fenced compound gradually replaced these well houses.

However, urbanization did not totally erase the imprint of the water delivery system

Left: Old well, 1950

Right: Replacement well #231, east of Mesa, 1951



and the Valley's farming heritage from the landscape. When some of the smaller canals and laterals disappeared into underground pipes, their routes remained imprinted on the surface geography and settlement patterns. The most obvious remnants were the main canals—the Arizona, Grand, and Crosscut on the north side of the river, and the South, Eastern, Consolidated, Tempe, and Western on the south side. Unlike the laterals, these canals remained open, and as the cities grew, only major streets crossed them. The canals, their high banks topped by maintenance roads, became boundaries between subdivisions, and residential streets followed their contours. In a few places, the canals were incorporated more meaningfully into their surroundings. Custom-designed bridges over the Arizona Canal marked the entrance to the Arizona Biltmore Hotel, and the raceway of the Tempe Canal at the old Chandler hydropower plant (demolished in the early 1950s) tumbled between fairways at the Mesa Country Club.



Urban irrigation
sign-up board

Another important effect of the SRP irrigation system on the urban landscape was neighborhood irrigation. SRP traditionally supplied irrigation water to subdivisions that took over SRP farmland as long as a majority of neighborhood homeowners wanted the service. The water was delivered on a rotation, and city or SRP “townsite zanjeros” directed the water through each subdivision.¹³ Residents loved getting flood irrigation on their lots every two weeks, for even at the height of summer, that was all the watering most yards and trees needed. The *Arizona Republic* tried to capture the flavor of the ritual: “It is 3:00 a.m. with a banging on the door. Through the bedroom window, the fitful flare of a lantern. No, children, not Paul Revere. The irrigation man. Ditch water coming in!”¹⁴ In fact, though, with an “irrigation man” turning the water on and off, a homeowner with a well-prepared lot—one that was level, with berms all around and the house slab foundation at least six inches above grade—could probably sleep through the process. After thirty to ninety minutes, depending on the size of the lot, the yard transformed into a lagoon, with doves and blackbirds bathing noisily and hunting for floating insects.



Residential irrigation

As development increased, it became more and more difficult for SRP to continue to operate this urban irrigation service. The cost rose from \$45 to \$125 per customer, per year. Even at that price SRP could not break even, so the urban zanjero program ended in 1955. The provision of irrigation water to urban lots continued, however, under the “board system,” which allowed homeowners to sign up for water on a sheet clipped to a covered board in the neighborhood.

SRP delivered water to the subdivision irrigation system, and homeowners took responsibility from there. Private irrigators often contracted with homeowners to run the water to their lots. By the end of the twentieth century, this system still served some 10,000 acres of subdivisions and 25,000 acres of parks and schools in Valley cities. These areas of spacious lawns and luxuriant foliage are a reminder of the Valley's farming past.¹⁵

ON THE WATERSHED

While the domestic water agreements provided a framework for managing the gradual shift of Valley lands from agricultural to urban uses, there was an equal need to address problems on the vast watershed of the Salt and Verde Rivers. The federal government set aside several of Arizona's national forests in the early years of the twentieth century in part to preserve the watersheds from overgrazing by cattle and sheep, which could denude the slopes of moisture-holding grasses. Yet despite the efforts of the Forest Service, overgrazing continued to be a problem.

The greatest challenge to watershed management hinged on the realization that removal of cattle and sheep from overgrazed areas did not necessarily lead to the return of beneficial range grasses but thick growths of brush and scrub trees instead. Not only did the larger plants require more water than the grasses, but they also reduced potential grazing acreage and increased the destructiveness of wildfires.¹⁶ As debates over the management of vegetation intensified over the years, SRP and cattle ranchers found that they were allies rather than foes in trying to promote the return of range grasses.

The two principal movers of this effort were Jake West, who had spent forty years exploring and guarding the watershed for SRP, and Dave Wingfield, a Flagstaff-area rancher who had been running cattle on the watershed since the late 1800s. West and Wingfield agreed that the accelerated decline in runoff was likely the result of the proliferation of brush and trees, which were replacing grasses on the abused grazing slopes of Arizona's national forests, and they took positive steps to restore the grasslands of the watershed. In partnership with state and local politicians, ranchers, the Forest Service, and SRP, they worked to manage watershed runoff and vegetation.¹⁷ But the issues were not easily resolved, and the different groups with interests on the watershed—which also included the USGS, the Soil Conservation Service, and the Arizona Game and Fish Department—did not always agree on goals and means.¹⁸

Nonetheless, in 1956, representatives of mining, ranching, farming, recreation, lumbering, and other interests joined with SRP and the State Land Department to form the Arizona Water Resource Committee, which promoted the concept of watershed management and raised more than \$10 million in government and private funds for watershed management research projects.¹⁹

UPSTREAM DIVERSIONS

Cows and juniper trees might have been responsible for some reduction in runoff, but a far larger reason for water loss was dam building and well drilling on land that had previously

been undeveloped. The Salt River's eastern tributaries—the White and the Black Rivers—receive runoff from lands on the Apache-Sitgreaves National Forest and the Fort Apache Indian Reservation; historically, this water was almost untouched until it flowed into Roosevelt Lake. Tonto Creek, the other main tributary of the Salt, was settled in the 1880s, but the population was sparse and water use minimal.

The Verde River collects a great deal of precipitation from the Coconino and Prescott National Forests. Beginning in the 1860s, small riverside farms in the Verde Valley began diverting water from the river and its feeder creeks near Cottonwood and Camp Verde. Verde Valley water users were defendants in the *Hurley v. Abbott* water rights suit decided in 1910, but Judge Edward Kent ruled that the effect of their water use did not significantly interfere with the supply of Salt River Valley diverters, so their rights were not adjudicated at that time.²¹

In 1925 and again in 1940, SRP engineer T. A. Hayden surveyed water use on the upper Verde River. The system he found there was totally unlike that in the Phoenix area. In the rolling hills and plateaus of the Verde country, only riparian bottomlands could be irrigated, so farms and the ditches that served them were small and close to the river. There was plenty of water, so the ditches ran full all the time, and whoever needed the water used it with no diminishment to his neighbors. Hayden estimated that the 7,000 acres of Verde Valley farms diverted at least four times as much water per acre as Phoenix-area farms, yet there was no waterlogging of the soil and most of the water returned to the river. Hayden concluded in 1940 that any attempt to enforce SRP water rights against the irrigators in the Verde Valley would not yield much.²²

This nearly stable situation began to change after 1945. The problem was not agricultural use on the watershed but rather increasing population numbers in the Verde Valley and the Mogollon Rim country that drained into Tonto Creek. Construction in the 1950s of the first real highways from Phoenix through the two watersheds—the Black Canyon Highway to Flagstaff and the Beeline Highway to Payson—greatly increased the accessibility of these areas and led to additional settlement by permanent residents, construction of summer homes, and recreational use of the national forests.

In the face of this development and the continuing decline of runoff, SRP began more aggressively defending its upstream water

Rainmaking machine built by SRP employees installed at Stewart Mountain Dam site, 1949



Rainmaking

In post-World War II Arizona, the intriguing idea of developing new technology for making rain captured the attention of its citizens. In 1946, scientists at General Electric's laboratories in New York discovered a method of creating rain with dry ice or silver iodide particles. When applied to the super-cooled water found in large cumulus clouds, the resulting chain reaction spurred the formation of ice crystals, which fell to earth as rain.

In the summer of 1947, the Arizona Republic conducted an experiment in which 500 pounds of dry ice was dropped from the back of a DC-3, producing heavy rain over the Verde River watershed east of Paradise Valley. This new technique was touted by the Republic and "precipitation control" entrepreneurs as the answer to the drought that gripped the Southwest at that time. Soon, SRP contracted with rainmaking companies for cloud seeding services and placed rainmaking machines designed by its own employees in the mountains of the Salt and Verde watershed. Success was difficult to measure with precision, but SRP officials claimed increases of up to 50,000 acre-feet.

Though the "science" of rainmaking remained questionable, interest continued to grow and SRP continued to test cloud seeding techniques. When above-average runoff returned to the Valley in the late 1960s, cloud seeding lost favor and SRP moved on to other projects.²⁰

rights. Jake West became SRP's chief hydrographer at about the same time as development in the Verde and Tonto basins was beginning to take off, and he took a hard line with those who made what SRP officials considered to be illegal diversions. "Jake developed a very acid reputation because he did his job," remembered Bill Warskow, who later held the same position. "Everybody in that county [Coconino] cussed the Salt River Project."²³ SRP tried various means of contesting the appropriations of water in the Verde Valley, including protests to the State Water Commission against new diversions and pumping from underground streams and filing injunctions against diverters. Later, as the competition for Verde Valley water increased, many water users in the area found themselves allied with SRP in efforts to preserve their prior rights.

Diversions were also increasing on the tributaries that fed the Salt River, mostly for fishing lakes. In 1946, SRP attempted to stop the Arizona Game and Fish Commission from expanding Big Lake in the Black River drainage of the Apache-Sitgreaves National Forest. SRP ended its opposition after reaching an agreement that allowed it to draw from lake waters in times of drought. The agreement also allowed for surplus water to accumulate in the lake in time of flood, so the likelihood that Big Lake would ever be drained on account of a Valley water shortage was remote.²⁴ The most important issue, as far as SRP was concerned, was that no one acquired new rights to water that would diminish SRP shareholder rights.

Another issue arose in 1956 when the White Mountain Apache Tribe of the Fort Apache Indian Reservation began construction of a dam on Trout Creek to create Hawley Lake and asserted claims to water from the White River for irrigation. SRP offered to accept the Apache Tribe's plans on a basis similar to the arrangement made for Big Lake. The tribe agreed to this approach, but the Bureau of Indian Affairs (BIA) office in Washington vetoed the deal in anticipation of upcoming adjudication of water rights for all Arizona Indian reservations.²⁵ The White Mountain Apaches completed the lake without an agreement in place, over SRP's objections, but the debate would continue in future years.²⁶

MEETING POWER NEEDS

In the 1950s, SRP added to its power generating fleet to satisfy needs of the growing metropolis, state, and region. What started as a relatively small and geographically limited area of focus—the Valley of the Sun—soon expanded to include other parts of Arizona, as SRP became an increasingly regional power provider. This evolution, however, did not mean that SRP ceased to focus on its home community—quite the contrary. In the post-war period, SRP took steps to meet customer demand, which began to diversify beyond the traditional power uses of rural farm service and irrigation pumping. SRP's power customers increasingly included industrial, manufacturing, commercial, and residential accounts as the Phoenix economy boomed, adding thousands of diverse new businesses to the thousands of new residents.

The explosive growth of the 1950s posed challenges not just in how much energy SRP's

customers needed, but also when they needed it. The spread of modern air-conditioning technology increased the portion of the year when comfortable temperatures could be found. The attractiveness of Arizona as a destination grew, and in 1957 central air conditioning could be included in an FHA-backed mortgage, placing it within reach of the numerous new arrivals.²⁷

This newly accessible luxury quickly became an indispensable feature of modern central Arizona living. It also, however, posed a unique challenge for power providers like SRP, who faced the need to plan their system capacity around the hour of the year—usually a hot summer afternoon—when the greatest demand for power occurred. The near-simultaneous turning on of thousands of AC units across the area meant that “the peak,” as this phenomenon was called, would be higher and sharper than ever before. SRP had recorded its maximum electrical demand for years, but 1951 marked a milestone in growing power needs as the company reported the specific day when the peak was reached in its Annual Report for the first time: 166 MW, on Thursday, June 28.²⁸

To meet the needs of an electrically cooled and rapidly expanding community, SRP began construction on a new fleet of oil- and gas-fired generating stations in the Valley. The first of these, Kyrene Generating Station, opened in 1952 to great fanfare. The *Current News* touted the new plant’s opening as “undoubtedly the most important event of 1952,” and “as important to all of us as the dedication of Roosevelt Dam forty years ago.”²⁹ Kyrene’s Unit 1 effectively doubled SRP’s total power output and offered greatly improved efficiency and reduced fuel costs. Agua Fria Generating Station, completed in 1961, added additional peaking power in the West Valley and was considered the most modern electric plant in Arizona. These new assets also represented the first major moves away from hydropower (which still provided more than 75 percent of the power SRP delivered in 1952) since the Crosscut diesel plant, which opened in 1938.³⁰

THE COLORADO RIVER STORAGE PROJECT

Even with these new generation resources, demand continued to increase, raising fears of impending power shortages in Central Arizona.³¹ In 1960, SRP estimated that it would need an additional 1,008 MW of generation in order to continue serving new and existing customers.³² Management recognized the potential vulnerability in SRP’s limited generation portfolio and took steps to identify new resources.³³

One promising possibility was a permanent allocation of power from the Colorado River Storage Project (CRSP). Authorized by Congress in 1956, CRSP was a multipurpose reclamation project intended to foster growth in the states of the Upper Colorado River Basin (Colorado, Utah, Wyoming, and New Mexico) by providing hydropower generation and irrigation development with the construction of four major facilities: Glen Canyon, Curecanti, Flaming Gorge, and Navajo Dams.

CRSP’s low-cost power was an attractive asset. Between 1956 and 1961, SRP and other regional utilities debated who would have access to the output of the new dams, and other

thorny issues around the construction, location, ownership, and management of the new extra-high-voltage transmission lines that would move it throughout the region. The eventual agreement was a compromise—a mixed system, constructed by both the government and private utilities, which would provide CRSP power to Arizona while also allowing for growth and seasonal demand in the Upper Basin states via an innovative exchange agreement with the USBR, the first in which SRP had participated.

To fulfill the agreement, SRP committed to provide 600 MW of power to the Upper Basin states by constructing additional generating resources near Upper Basin load centers, utilizing coal supplies in northern Colorado for fuel.³⁴ As the capacity of SRP's generation in the Upper Basin states increased, so would its capacity to meet growing demand in the Valley.

The result was SRP's first two ventures into coal-fired power generation: Hayden Generating Station, which came online in 1965, and Craig Generating Station ten years later. Unlike its previous power facilities, which it had built, owned, and operated on its own, the economic benefits of joint financing, ownership, and management motivated SRP to seek participation opportunities with other entities.³⁵ These new assets provided much-needed additional generation resources, ensured reliability through a more diverse generation portfolio, and generated low-cost energy to pass on to customers.

ELECTRIC TERRITORIES

SRP also faced challenges to its rights to deliver electricity in the Valley. In the early years of the twentieth century, a number of small electrical power systems had operated in the budding community. PG&E had a franchise to serve the city of Phoenix, and several Valley towns operated municipal power departments that purchased wholesale power from SRP. CALAPCO acquired PG&E in the early 1920s and eventually received franchises to serve all the Valley towns except Mesa.

In 1929, SRP and the City of Mesa agreed on a division of territory by which the city would buy SRP power but operate its own power department in a one-square-mile territory. In 1938, this territorial agreement was renewed.³⁶ The arrangement served SRP and the city well during the years of slow growth prior to World War II, but by the late 1940s, increasing immigration to the Valley prompted Mesa to draft plans for managing its future development. As the city annexed adjacent areas, it also expected to expand its municipal utility service.³⁷ The City of Mesa allowed the existing power contract with SRP to expire in 1949, opting instead to purchase electricity from the Arizona Power Authority (APA), supplemented by SRP resources.³⁸ However, it was much more difficult for SRP and Mesa to reach agreement on territorial issues.

For several years, SRP and Mesa attempted to negotiate a new agreement; eventually, the two entities agreed on a general plan, but they could not conclude a deal over the size of Mesa's delivery territory. Frustrated by the inability to forge a settlement after five years of discussion, SRP broke off negotiations with the city in May of 1954.³⁹

Mesa wasted little time responding to SRP's suspension of talks. In fact, the city had already initiated a lawsuit to gain a much larger service area than the one under negotiation, a move initially seen as a bargaining tactic. However, Mesa indicated it would indeed seek to gain this area—ranging from the Tempe border to Power Road and from Baseline Road to the Salt River—in court.⁴⁰ As the lawsuit unfolded, both Mesa and SRP made aggressive moves in the field, building new power lines in disputed territory. On September 15, 1954, to facilitate service until the litigation concluded, the two sides agreed to a temporary boundary based on the approximate service territories in effect at that time.

Mesa's case focused on the city's right to engage in the utility business. City Attorney LaMar Shelley argued that the city could provide exclusive utility service within municipal boundaries and limit competition by denying other utilities the use of city streets and alleys for power poles and lines. More important, Shelley maintained that when the city annexed land served by another provider, its right to serve residents within that area became exclusive. In other words, Mesa claimed to have every right to prohibit SRP operations within the newly acquired territory.⁴¹

In reply, SRP lawyers claimed that SRP also had the right to sell and distribute electric power, and that on matters of statewide concern—especially the operation of public utilities—the state, not individual municipalities, had exclusive jurisdiction over streets, alleys, and public paths. Furthermore, the state had expressly granted to public power districts the right to build utility works on land owned by either the state or a city. Finally, they argued, state law prohibited a municipal utility from extending its service into an area already being served by another utility, regardless of whether that provider was a public or private entity.⁴²

After much delay, the Maricopa County Superior Court finally announced its decision in May 1959. It found that the city did not have the right to encroach upon SRP territory and that the electricity service boundaries defined in the 1938 contract renewal were binding. Dissatisfied, the City of Mesa appealed the verdict, and on July 5, 1962, the Arizona Supreme Court partially overturned the judgment, holding that although SRP had a right to serve annexed areas, the city could condemn and acquire SRP facilities upon payment of just compensation.⁴³

The court's reversal, which seemed to give Mesa permission to go beyond its city limits to take over SRP facilities, alarmed SRP management. If other cities followed Mesa's lead, wrote Associate General Manager Les Alexander, "the Project's retail electric operations could eventually be almost entirely eliminated."⁴⁴ This would destroy SRP's ability to repay its debts to bondholders and the United States. Especially troubling was that Mesa—and potentially other cities—could accomplish this by buying Colorado River power from the USBR, thus benefiting one reclamation project at the expense of another.⁴⁵

After several more months of fruitless negotiations, the city in December 1962 filed a test condemnation suit involving SRP facilities serving an east Mesa shopping center. The

Mesa Tribune reported, “Presumably if Mesa wins the test case, it will be able to take over other project facilities in the city with little trouble because the suit would set a precedent.”⁴⁶ In response to the action, SRP appealed the Arizona Supreme Court verdict to the US Supreme Court and actively sought the support of the USBR and the DOI. SRP attorney Ted Riggins emphasized that the case involved more than SRP because the federal government retained an ownership interest in SRP as well as other reclamation projects. He encouraged DOI administrators to file an amicus brief and join the litigation on behalf of SRP. Riggins’ arguments resonated with the Secretary of the Interior and, with the services of the Justice Department, in September 1963, the federal government filed a Representation of Interest in the case.⁴⁷ Because a city cannot normally condemn federal property, Mesa’s condemnation suit was dismissed, ending the litigation but not the dispute.

Although SRP and the City of Mesa made several attempts in the late 1960s and early 1970s to settle the issue, no final territorial agreement was ever established. Both sides simply refused to move much from their established positions. SRP wanted fixed service boundaries but, buoyed by the failure of Mesa’s court case, remained unwilling to give too much to attain them. For their part, city officials did not see any value in binding Mesa to a territorial agreement. In 1966, SRP Planning Director Frank Scussel and Rates and Taxes Manager E. K. Carpenter characterized the stalemate succinctly: “What we want to buy—a territorial settlement—Mesa doesn’t want to sell at any price less than the benefit it would receive by winning its case in court. To search for a middle ground is only to discover that it doesn’t exist.”⁴⁸ After two decades of negotiation and litigation, SRP and Mesa found their relationship still governed legally by the 1938 contract and operationally by the temporary territorial agreement negotiated in 1954.

The assertion of federal interest in the electricity business of SRP, limited though it was, was a key event in defining SRP as a public, not a private, enterprise and as an agency governed by federal interest as well as state law. Like the 1917 contract with the federal government and the 1937 creation of the District, the Mesa lawsuit had lasting implications for the nature of SRP.

ARIZONA PUBLIC SERVICE COMPANY

As part of their 1928 Stewart Mountain contract, SRP and CALAPCO designed a territorial division giving CALAPCO the right to provide electricity service in Phoenix, Glendale, Peoria, Scottsdale, Tempe, Chandler, and Gilbert, while reserving most of the rural areas for SRP.⁴⁹ Following this agreement, SRP developed its electric service program to accommodate rural needs; many of the customers were SRVWUA shareholders.

This arrangement was still in place in 1945 when Arizona investors gained control of CALAPCO. In the years that followed, CALAPCO acquired utilities serving northern Arizona, and in 1952 it merged with Arizona Edison Company, which served towns in the central and

southern parts of the state. The merged utility was called Arizona Public Service Company (APS). Faced with explosive growth and an expanding market, and as a consequence of vague wording in the 1928 agreement, SRP and APS developed conflicting interpretations of their respective service territories. APS believed it could expand its service territory in conjunction with the expansion of city limits, regardless of existing SRP facilities. In a letter to APS President Henry B. Sargent, SRP President Pickrell stated that SRP would willingly work to resolve territorial differences, but he also made it clear that “in any solution of our territorial problems no changes in the present allocations of territory with the Project are possible.”⁵⁰

While tensions remained high and negotiations were strained, each company attempted to gain a practical advantage as new subdivisions were being built on farmland near the towns; most of the competition took place in existing SRP territory rather than in APS territory. The rush to capture new customers peaked when APS announced that it would provide electricity service to a newly subdivided area south of Arizona State College in Tempe, where SRP had previously served scattered farms. “There were times,” Rod McMullin recalled, “when we rushed crews out, served [customers] from our lines before APS could drop their lines in there, and we claimed them for our customers. APS was doing the same thing around the area. We were spying on each other, following crews, and seeing who was up to what. It wasn’t a good situation.”⁵¹

At the center of this territorial question were the differing interpretations by SRP and APS of the 1928 agreement which delineated the electric service area for each company. Fortunately for SRP, Corporate Secretary Lawrence Monette located early correspondence between Association Superintendent Charles Cragin and CALAPCO officials that strongly supported SRP’s interpretation of the agreement. Furthermore, SRP’s general manager of power, Stan Ward, argued that the rural electrification program that followed the 1928 agreement represented an investment in the Valley by SRP shareholders similar to their investment in Roosevelt Dam. “The power system was financed to serve scattered rural areas at a time when the load did not justify the investment,” Ward said. “The landowners assumed this burden with the faith that the growth of the community would justify it.”⁵² Despite the fact that both parties found consensus around the 1928 agreement, a second territorial agreement was warranted due to unanswered questions concerning lands at the fringes of SRP territory and extending into the rest of the state.

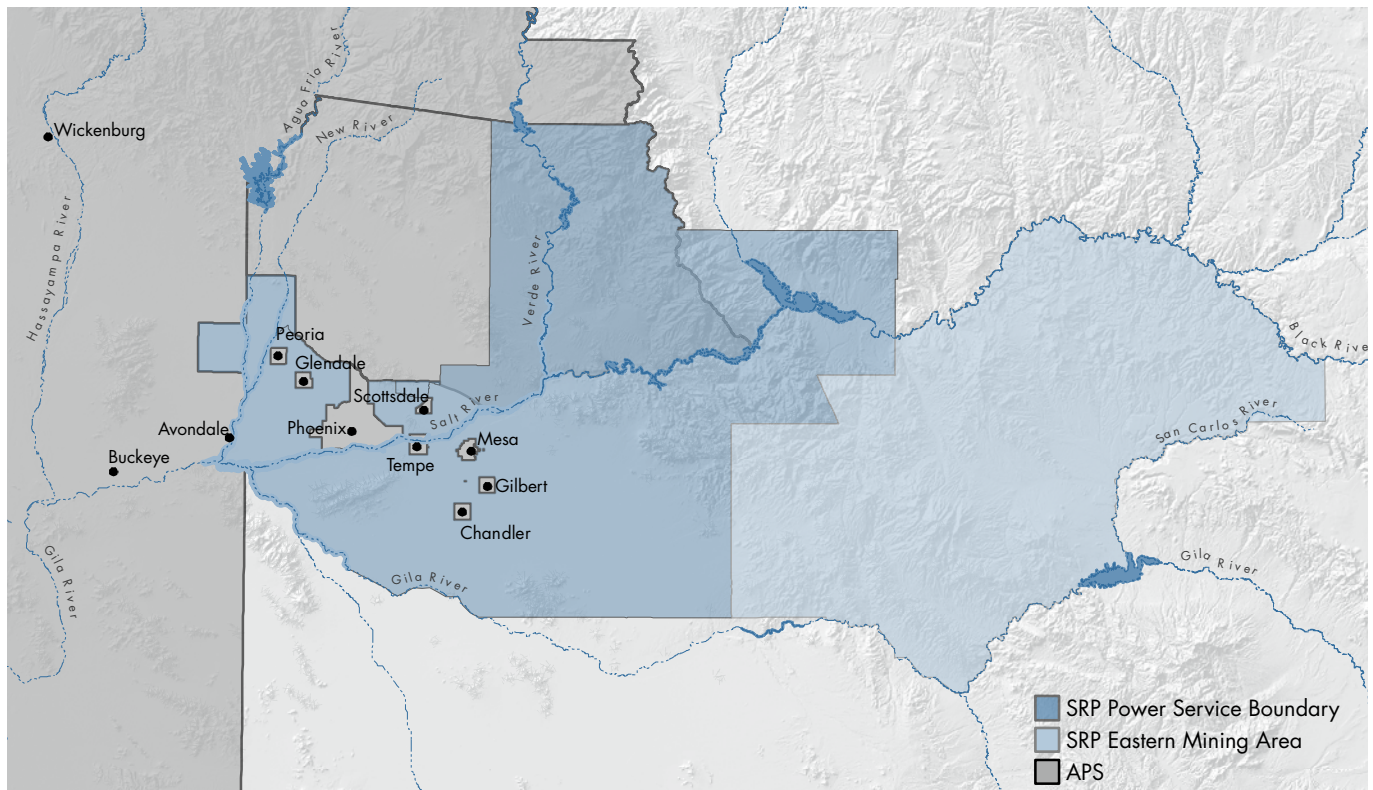
The 1928 agreement had also apportioned lands outside SRP territory, allowing it to serve rural areas in northwestern Maricopa and Pinal Counties. Now APS sought to limit SRP’s power distribution to shareholder lands only—the 250,000 acres which received SRP irrigation water.⁵³ In June 1953, negotiations between the two companies began, with SRP refusing to concede any significant growth to APS in the SRP area; two years later, the two utilities finally reached an accord. SRP prevailed in its interpretation of the 1928 contract, retaining electricity service to city annexations in the SRP area, the mines of Gila County, and the undeveloped

areas of the east Valley. APS kept its service in the old townsites and won the right to serve the undeveloped areas in the west and north Valley. SRP also conceded the rest of the state to APS. The two companies finalized the territorial agreement in August 1955.

As important as this new territorial agreement was, equally vital was another new agreement designed to improve electric service for customers of both companies. During the course of negotiating new service areas, managers and engineers from both utilities recognized the disadvantages, inefficiencies, and increased costs that resulted from maintaining two separate, unconnected power distribution systems in the Valley. As a result, they began to consider ways to align their power operations. In September 1955, only weeks after signing the territorial agreement, APS and SRP also unveiled a new power coordination agreement.

In effect, the power coordination agreement treated the two electricity systems as one, creating a synchronized system designed to increase reliability and lower costs for all power customers in the Valley. It also allowed each company to maximize economies of scale when building new power plants by providing for reciprocal purchases of surplus power.⁵⁴ Thus, when SRP began work on its new Agua Fria natural gas-fired plant in the west Valley in 1958, it had a ready customer for any of the new power it could not use. The same applied when APS built its new Ocotillo plant in Tempe a few years later.

SRP power service territory after the 1955 agreement between SRPAIPD and APS



THE PROPERTY TAX CONTROVERSY

Despite the recent agreements, the tension between SRP and APS that had simmered during the debates over CRSP power and territorial boundaries in the 1950s soon boiled over. The trouble began in 1958 when former SRP President Richard Searles advocated the taxation of the Salt River Project as part of his campaign for governor of Arizona.⁵⁵ Eugene Pulliam, the influential publisher of the *Arizona Republic* and the *Phoenix Gazette*, shared Searles' view. Searles lost the governor's race to Phoenix businessman Paul Fannin, but the debate over the difference between public and investor-owned utilities became the subject of front-page news in the Valley for several years, with both sides ardently arguing their positions.⁵⁶

SRP pointed out the reasons for its tax-exempt status and attempted to explain why changing that status would do more harm than good. "It must be obvious to everyone," its advertisements asserted, "that any tax the Salt River Project is forced to collect must be paid by the people through higher electric rates, higher water costs—or both."⁵⁷

Despite these efforts to convince Valley residents of the merits of its case, however, public opinion remained firmly against SRP, and in January 1963, Governor Fannin recommended that the state legislature look into the issue of taxation of agricultural improvement districts.⁵⁸ By now it was clear that some sort of tax would be imposed on the organization, and SRP officials began to consider a compromise. They proposed that the Governor appoint a committee to investigate the issue, and he quickly agreed.

The committee, which included pointed critics of the Project like Eugene Pulliam, deliberated for several weeks. SRP stressed the legal complexities involved in any effort by the state to impose taxes on a federal reclamation project. The committee was responsive to this argument, concluding that in-lieu payments toward schools and other government functions would not only be in the best interest of the Arizona economy, but vital to maintaining state unity in the ongoing drive to get the CAP bill through Congress.

In April 1963, the committee submitted its recommendation to the Governor that SRP make an annual payment to the state in lieu of taxes. This contribution, though mandated by law, would be a "voluntary" one and would accomplish the purposes of a tax but still recognize SRP's public, tax-exempt status. The formula also included a provision that reflected the Governor's recognition of SRP's status as a multipurpose reclamation project and excluded irrigation functions from the payment formula.⁵⁹

Later that month, a joint session of the Arizona Senate and House passed legislation formalizing the arrangement. Some of the state's newspapers and politicians voiced relief that a workable solution had been found. "Had this fight been allowed to go to the polls with all the inter-mixing of politics," observed Senator Barry Goldwater, "it could have split the state asunder and stopped the remarkable growth" of the Salt River Valley.⁶⁰

During the mid-twentieth century, the remarkable growth of central Arizona required

municipalities and utilities to modernize their infrastructure and better regulate resource uses and services. In addition, the persistent and growing need for water and power across Arizona began to highlight some of the negative impacts of growth while raising ever-increasing concerns for meeting customer needs at reasonable costs. More challenges lay ahead in the form of new risks to the water supply and new questions about the environmental issues associated with power production.



CHAPTER TEN:

SHIFTING GEARS

While SRP employees were busy upgrading the power system, piping irrigation ditches, and modernizing the administration of the company, world events and societal changes were underway which would soon have an impact on every aspect of SRP's operations. The 1960s were a chaotic decade, as society was deeply shaken by new ideas and movements that shattered the postwar consensus. Americans who were unsatisfied with the status quo increasingly questioned traditional mores and methods. Debate was a given, and widespread social discontent over the Vietnam War, civil rights, and environmental issues fostered an increasingly cynical public attitude about the activities and motives of government and other large institutions—a shift in consciousness that became embedded in American politics and culture.

These changes made for a difficult environment for electric utilities, water providers, and corporations throughout the United States. The national economy was in freefall for much of the 1960s and 1970s as the spiraling cost of the war and growing federal deficit led to inflation, which caused operations and finance costs to rise rapidly, none faster than the cost of oil and natural gas.¹ All the upheaval did not stop the population growth of Arizona and the Valley, however.² The continuing advance of migration to the Southwest meant that SRP, along with other regional utilities, had to make long-term strategic decisions for an uncertain future.

COAL-FIRED POWER

As the political and social era of the 1960s and 1970s profoundly changed many aspects of SRP's culture and ways of doing business, the population growth and developing economy of the Valley demanded that SRP continuously expand

its electric generating capacity. In 1970, SRP started the biggest construction project it had yet attempted—the 2,250 MW Navajo Generating Station in Page.

Though SRP had long sought to build an Arizona coal-fired plant, and had been planning for several years to take that step, events outside its control actually precipitated the accomplishment—the state of Arizona and the federal government needed to ensure a future for the CAP. The CAP had been a key issue in Arizona politics for nearly half a century; Republicans and Democrats, city dwellers and rural residents, politicians and business operators all united in the quest for a reclamation project to bring Arizona's share of Colorado River water to the populated regions of the state. In 1963, the US Supreme Court ruled on *Arizona v. California*, affirming Arizona's right to a portion of water from the river. Although shepherded by Arizona's powerful congressional delegation and supported by the Secretary of the Interior and President Lyndon B. Johnson, the 1965 CAP bill ran into opposition. Led by the Sierra Club, the nascent American environmental movement mounted a national campaign to prevent the building of two hydroelectric dams on the Colorado near the Grand Canyon at Bridge and Marble Canyons. These dams were intended to defray construction costs and supply the power for huge pumps needed to lift Colorado River water more than a thousand feet out of Lake Havasu and into an aqueduct that would flow to the Valley and then on to Tucson. As public opposition mounted, it became clear that any CAP bill which included those dams was at risk.³

Arizona politicians feared the opportunity to pass a CAP bill might be slipping away. To save the project, Secretary of the Interior Stewart Udall summoned the leaders of the major southwestern utilities to the Los Angeles airport hotel for an emergency meeting.⁴ Udall acknowledged the political strength of the environmental lobby, McMullin later recalled, "but we were very glad to hear him say that, nevertheless, even with this opposition, the Central Arizona Project would be built."⁵ The Interior Department had just completed an extensive study concluding that it was possible to operate the CAP without the new Colorado River dams. Udall informed the utility executives that instead the CAP bill would call for a power station to be built on the Navajo Nation using coal mined on the reservation for fuel. When some of the utilities voiced misgivings, McMullin remembered, "Stewart Udall said, 'well, gentlemen, this is simply the way it's going to be.'" Udall closed the meeting by announcing to the surprised executives that the construction of the proposed plant on the Navajo Reservation would be managed by the Salt River Project and upon completion would be operated by SRP.⁶

PLANNING FOR THE NAVAJO GENERATING STATION

SRP had constructed its own natural gas-fired steam generating stations in the Valley and participated in building other coal-fired power plants in the 1950s and 1960s, but Navajo Generating Station (NGS) was its first attempt to manage such a large and complex project. The CAP legislation that passed in September 1968 required the Secretary of the Interior to submit his recommended plan for the thermal generating station within a year, adding even



The groundbreaking ceremony at the NGS site in April 1970 was well attended by the multiple parties with interest in the plant. Pictured (not in order): Victor Corbell, SRP; Arleigh B. West, USBR; F. C. Keller, USBR; George Young, Navajo Nation; Howell R. Gnau, USBR; Max Llewellyn, APS; Larry Schneider, LADWP; Rex Tynes, Nevada Power Company; Andrew Pollina, Tucson Gas and Electric; John Kiely, Bechtel Corporation; John M. Arnold, Peabody Coal Company; and W. C. Burns, Morrison-Knudsen Company.

more pressure. Within the very limited time frame, SRP raced to develop the plans and solidify agreements with the project participants and the Navajo Nation. The task was formidable. As McMullin recounted, “The final plans for the plant, including the socio-economic studies, the resource studies, the water studies—all the things that had to be satisfied before ground was broken on that plant—stood stacked nearly seven feet high.”⁷

In siting the plant, the main considerations were proximity to necessary resources: coal, water, a major transmission corridor, and a town to support the construction crew and plant operators. One proposed location in northern Arizona checked all the boxes: access to Lake Powell water, coal from Black Mesa, the backbone transmission system of the region nearby, and the town of Page. The Navajo government also endorsed the Page site, as it would provide an opportunity to develop its Black Mesa coal deposits. Working with the Navajo Nation, SRP solidified plans to develop the 1,000-acre plant site and supply it with Black Mesa coal mined by the Peabody Coal Company and Lake Powell water for cooling. The plant owners also agreed to provide power to the Navajo Tribal Utility Authority and give preference to qualified reservation Navajos in all construction and operation hiring.

APS, Tucson Electric Power (TEP), the Los Angeles Department of Water and Power (LADWP), and Nevada Power Company joined SRP as part owners.⁸ In addition to its own share (21.7 percent), SRP would own, on behalf of the federal government, another 24.3 percent of the plant that was committed to CAP purposes.⁹ In December 1969, Secretary of the Interior Walter Hickel approved the contracts and leases for the Navajo station.¹⁰ Bechtel Power Corporation, one of the world’s largest engineering contractors which SRP had utilized in previous construction projects, won the general contract for the plant and broke ground in April 1970.¹¹

BUILDING NGS

Initial SRP cost estimates for the construction of NGS, the transmission lines, and the electric railway between Black Mesa and the generating station were over \$500 million. The generating station consisted of three giant turbines lying horizontally, each 167 feet long with a maximum diameter of 26 feet and weighing 446 tons. The three units, with a combined capacity of 2,250 MW, produced enough energy to serve 500,000 electricity customers, making NGS the largest electric generating plant in Arizona at the time.¹²

The continued growth of the environmental movement and the passage of the Environmental Policy Act in 1969, however, created uncertainty about environmental compliance requirements just as NGS was getting underway. Rather than gamble on whether requirements would change before construction was completed, SRP and its partners commissioned a variety of studies of the environmental impact of the plant, which resulted in the installation of modern air pollution control equipment, even though these measures practically doubled the plant's construction cost.¹³

Top left: Construction of the BMLP railroad track between the Kayenta Mine on Black Mesa and NGS, circa 1972

Top right: The BMLP computer-controlled electric train leaving NGS and returning to Black Mesa for another coal delivery to NGS, circa 1975

Bottom: Navajo Generating Station



The massive power output required new transmission lines to Phoenix and Las Vegas. Southern Nevada was becoming an important crossroads in the western power network, a junction where power from large coal and hydro plants in the Colorado River region was transmitted to California markets. The site was also close to CAP pumps in Lake Havasu. As was common in jointly built stations, other participants oversaw the construction of 800 miles of new extra-high-voltage 500-kilovolt (kV) transmission lines: APS built the NGS-Phoenix lines and LADWP built the NGS-Las Vegas line.

Completion of the first unit at NGS permitted transmission of power on February 1, 1974, with the second unit beginning commercial operation in April 1975 and the third a year later. The dedication ceremony took place on June 4, 1976, with many executives and government officials in attendance.

CORONADO GENERATING STATION

NGS was the ultimate expression of a jointly owned coal-fired mega-generating station on the Colorado Plateau. It was the biggest, most efficient, and most technically advanced of the power generating facilities built between the 1950s and the 1970s. At the same time, however, utilities continued to build smaller coal-fired stations on their own. APS built the Cholla Generating Station near Joseph City, TEP built its Springerville station, and in September 1973, SRP launched a site search for a new coal-fired generating station, initially dubbed the Arizona Station. The company had projected that its electric customers would increase by as much as 70 percent over the five years before Palo Verde Nuclear Generating Station (PVNGS) was completed and therefore required an interim power source.¹⁵

To initiate the comprehensive site selection process for the Arizona station, SRP formed a taskforce, which identified approximately twenty-five locations. The planning called for a 2,400-acre plant site in an area with plentiful groundwater capable of yielding a sufficient water supply for the proposed life of the plant (thirty-five years). The number of sites was reduced to nine, based on factors of accessibility, power transmission capability, air quality, meteorology, topography, ecology, land use, water availability, and socioeconomic and site-dependent costs.¹⁶ Ultimately, the field narrowed to two sites on the Little Colorado River Plateau, one just north of Snowflake and the other northeast of St. Johns.¹⁷

Reflecting the new cultural landscape and lessons learned from earlier coal-fired generating projects, between September 1973 and May 1974 SRP representatives met with

Black Mesa and Lake Powell Railroad

To meet the extensive fuel needs of the new generating station, which was capable of consuming up to 24,000 tons of coal per day, SRP planners designed the Black Mesa and Lake Powell Railroad (BMLP). The computer-controlled train, powered entirely by electricity delivered via an overhead system similar to a streetcar, brought coal 78 miles from Peabody's Kayenta Mine on Black Mesa to the generating station.

Prior to construction, SRP surveyed the route across the rolling, rocky terrain of the Navajo Nation and negotiated payments to those whose homes or corrals the line would displace. Archaeologists from Arizona's three universities documented archaeological sites along the right of way. Because ranching and herding was the chief occupation of Navajos on the reservation, SRP planners took extra precautions to protect livestock. Mesh fences were constructed along both sides of the track to keep animals off the rails, cattle guards were located at each road intersection, and seventy culverts were built to allow sheep and cattle to cross under the railroad bed.

The construction of the track began in February 1971 and was finished in 1973, by which time crews had moved more than 7 million cubic yards of earth to build the grade. Workers lived at a temporary camp at Plenty Water, about halfway along the railroad's route. When completed, the coal moved along a five-mile conveyor belt from the mine to the loading point, where it fell continuously into cars moving past at half a mile per hour. About seventy cars, each holding at least a hundred tons of coal, were pulled by three 6,000-horsepower electric locomotives supplied by General Electric on the eight-hour round trip.¹⁴

115 different agencies, public organizations, and area residents to discuss the proposed generating station. From the DOI to the Sierra Club, from city planners to the League of Women Voters, from other state utility companies to television stations, SRP cast a very wide net in preparation for construction and operation of the station.¹⁸

At this point, SRP began detailed environmental and engineering studies of the two top sites. Teams drafted plant layouts that included wastewater and ash disposal areas, located power transmission corridors, and developed tower designs. Well fields and water pipelines

were tested and sited. SRP negotiated with coal suppliers, investigated transportation systems for moving coal from the mines to the station, and studied socioeconomic factors in the two areas.¹⁹

The most promising well field was Concho, located between the two prospective sites. No matter which location, SRP management determined that they needed to acquire this field. Otherwise, both sites had good potential. The final decision to build at St. Johns was made in July 1974 during a meeting at the SRP administration building in Phoenix. A. J. “Jack” Pfister, who went on to become SRP’s general manager two years later, remembered, “As a kind of commemoration of the event, I gave

everybody a half-dollar with St. Johns on one side and Snowflake on the other side, because it really came down almost to a flip of the coin.”²⁰ Construction began on the new 715 MW facility, renamed Coronado Generating Station (CGS), in 1975. Unit 1 came online at the end of 1979 and Unit 2 was completed ten months later.

At the beginning of the 1970s, coal-fired power plants were viable and cost-effective options for the growing power production demands in the Southwest. Over the decade, however, the technical, economic, and political requirements of building such plants increased so drastically that coal-fired power became more financially (and politically) problematic. The decision to build CGS was in part a reaction to the problems inherent in large jointly owned plants. By bringing the sum of the organization’s experience and expertise to bear on CGS, SRP managers sought to create a plant that was a model of efficiency and engineering and also an advanced example of community relations and environmental sensitivity. By the mid-’80s, the customer base in the Valley was again growing at an astounding rate, and SRP began work on a third unit at CGS with preliminary planning for a fourth.



Coronado Generating Station units 1 and 2, circa 1980

PALO VERDE NUCLEAR GENERATING STATION

During the same general period, SRP joined other state utilities to bring nuclear power to Arizona. In 1970, APS, Tucson Gas & Electric Company, and SRP formed the Arizona Nuclear Resource Study Group to examine potential loads, resource needs, optimum installation size, and possible locations for a nuclear plant. The steering committee reported in April 1971 that it was feasible to build a nuclear power station capable of generating between 650 MW and 1,200 MW in the desert west of Phoenix.²¹ In 1972, SRP and APS formed the Arizona Nuclear Power Project (ANPP) to further evaluate the project and implement plans for the design, construction, and operation of a nuclear power station.²² As the studies proceeded, the need for economies of scale caused the plant to grow to three units of 1,270 MW each (3,800 MW total). At that level of output capability, the plant offered more than Arizona consumers required, so shares were later sold to utilities in New Mexico, Texas, and California. In late 1973, ANPP announced that PVNGS would be located fifty miles west of Phoenix near Wintersburg. Although it was eager to take on the challenge of construction and operational management, SRP was already deeply engaged in the building of NGS and reluctantly conceded the responsibility to APS for the new station. Bechtel Power Corporation was awarded the construction contract with work scheduled to begin in 1976 and a completion date of 1985.²³

SRP remained a significant owner of PVNGS and maintained equal ownership with APS for several years, overseeing construction of the plant switchyard and 165 miles of 500 kV lines, as well as the major receiving stations where most of PVNGS' power for Arizona entered the electrical system.²⁴

Before PVNGS' giant turbines ever spun, however, the plant had generated a large amount of controversy and opposition, which was further inflamed by the 1979 accident at the Three Mile Island nuclear plant in Pennsylvania. The economic and social climate of the 1970s and 1980s was difficult enough for large utilities to handle without an extended debate over whether PVNGS would bring "doom or prosperity" to the region, as one newspaper headline put it.²⁵ As project manager, APS bore the brunt of bad publicity surrounding the plant, but all the co-owners had to take on their share of another problem: spiraling costs. The plant construction,



Construction of Palo Verde Nuclear Generating Station, circa 1977

originally budgeted at less than \$2.5 billion, was approaching \$9 billion by 1984.²⁶

As construction delays pushed back the operational date of PVNGS, SRP faced a dilemma. It now appeared that before the nuclear plant was completed, SRP customer growth would require another source of generation. The organization decided to reduce its share of PVNGS ownership in favor of other sources of power. In 1983, SRP sold 5.9 percent of the plant capacity to the California Public Power Authority, and in 1987, it sold another 5.7 percent to the LADWP. The three generating units at PVNGS finally went into commercial operation between 1986 and 1988, making it the largest nuclear power plant in the United States at the time.²⁷

CHANGING ATTITUDES

In planning the first generation of coal-fired power generating stations in the 1960s and early 1970s, southwestern utilities received praise for their low operational costs, which in turn lowered electricity rates for utility customers. These projects also brought much-needed jobs to some of the most underdeveloped areas of the West. Soon, however, attitudes changed rapidly. These issues first came into focus around a large coal-fired generating station planned for construction on the Kaiparowits Plateau in southern Utah. SCE led the project for a consortium of utilities, all members of Western Energy Supply and Transmission Associates. SRP participated in studies as a utility potentially interested in Kaiparowits power. It was to be the world's largest generating station, with a capacity of 5,000 MW—enough electricity to supply a city of six million people. Yet it became the leading issue for many western environmental groups who opposed the large-scale surface mining of coal and the use of Colorado River water for the plant and who believed it would cause air pollution in nearby Grand Canyon, Zion, and Bryce Canyon National Parks. Both the government and the utilities struggled with the new process of filing an environmental impact statement, knowing that environmental groups were poised to sue if their concerns were not recognized. Meanwhile, the effects of inflation hit the country; from 1970 to 1975, the consumer price index increased at an average rate of 10 percent per year. Therefore, each delay in the project—the environmental impact statement and subsequent comments and hearings took five years to complete—increased its cost. Over the years, though plans for Kaiparowits downsized, costs climbed at an extraordinary pace. By 1975, the utilities estimated that the cost of the project was rising at a rate of \$1 million a day.²⁸

As the costs escalated, SRP concluded that Kaiparowits would never be built and ceased participation in the plant in 1975.²⁹ The project was ultimately canceled in April 1976. Many in the utility industry blamed the environmentalists for, in the words of SCE Vice President William Gould, “beating the project to death.” Others believed the fault lay squarely on the federal government’s “bureaucratic muddling,” noting that Kaiparowits “literally strangled in red tape.”³⁰

The combined experience of building NGS, CGS, and PVNGS, and the problems at Kaiparowits profoundly affected the approach taken by SRP managers, not just in building

future coal-fired power generating stations, but also in shaping the company's overall response to environmental issues. Jack Pfister, formerly an attorney at JSS, had joined SRP and became the point man on environmental issues for the company. "I really got a baptism by fire," he later recalled. "I traveled all over the Southwest debating environmentalists about the merits of power plant generation. I started off by thinking that they were just a bunch of radical hippies, and I came away from that experience, and my reading, convinced that there was a lot of merit to what they were saying."³¹ SRP soon created an environmental department to manage the emerging compliance obligations resulting from the increasing number of new laws as well as the lawsuits that the environmental movement generated. When Pfister succeeded Rod McMullin as general manager in 1976, the company became even more proactive toward environmental issues, constantly seeking to balance its business responsibility to its customers and bondholders with its environmental responsibility to the larger community of the Southwest.

EQUALITY OF OPPORTUNITY

Of all the societal changes that took place during the Johnson administration, none transformed American society more than the passage of the 1964 Civil Rights Act which, along with the Equal Pay Act that preceded it by a year, sought to equalize the opportunities available to women and minorities, including in the workplace. In response, SRP embraced equal rights in its hiring practices and quickly became known as a Valley employer seeking minority applicants. Over the next few decades, SRP initiated more aggressive affirmative action programs in its human resources operations with a particular focus on addressing sex- and race-based inequities, as well as the hiring of veterans. Additionally, the company expanded its community support to include direct financial support for education and scholarship funds and job services and minority advocacy agencies.³² These and other efforts slowly diversified SRP's workforce, as more women and racial and ethnic minorities joined the company.³³

Like most utilities, SRP had traditionally been a workplace for men with very limited opportunities for women. At the end of the 1960s, as the company began to address job inequality, there were fewer than 200 female employees in a workforce of 2,000. While women were heavily concentrated in secretarial positions, a few had attained nontraditional jobs, and growing numbers of women moved up through the SRP ranks as supervisors.³⁴ Other women filled unique, albeit more traditional positions, such as the Home Service Advisors, part of a promotional program to teach cooking with electricity, or the full-time Registered Nurse who administered the SRP Health Services program which provided medical care and on-the-job safety and rescue training.³⁵



SRP advertisement promoting new career opportunities for women, 1979

Despite these efforts, in 1976 former employee Gail Henson sued SRP in federal court alleging discriminatory practices in pay and promotion opportunities. After a 1980 settlement, SRP agreed to further increase its percentage of female employees and initiated several programs to provide a wider range of experiences and opportunities for women.³⁶ An internal support group, the Project Women's Exchange, was formed to promote the advancement of women and provide a home base for the cadre of female workers who had come to SRP seeking career opportunities.³⁷ In 1982, some of these women participated in a rotational program designed to familiarize them with various aspects of the company, and many went on to long careers at SRP. In partnership with Local 266, SRP also began recruiting women for craft jobs, and by 1981 five women had entered the apprenticeship program.³⁸

ONE ACRE, ONE VOTE

Other profound changes in American political life grew out of Supreme Court decisions and voting rights legislation in the 1960s mandating the principle of “one person, one vote.” This principle became the basis for a series of legal and legislative challenges to the SRP acreage-based voting system. The first such challenge evolved out of a dispute over effluent between the City of Phoenix and SRP.

By the 1960s, the search for new water resources had widened to include effluent, or treated wastewater, which at the time was released from municipal water treatment plants into the Salt River bed. In 1967, when the City of Phoenix offered to sell 80,000 acre-feet of treated effluent to the Buckeye Irrigation District, SRP challenged the city's right to sell any water—even wastewater—supplied under the 1952 contract. SRP was most interested in preserving the reclamation principle that SRP water not be taken out of the SRP territory for any use—even wastewater or “return flow” water that had already been used once. This was a principle that had become increasingly important as the Phoenix metropolitan area expanded far beyond its historical boundaries, because only designated SRP shareholder lands retained the water rights and repayment obligations of SRP membership.

The issue of effluent ownership was quickly subsumed in matters that threatened the independent existence of SRP. In late 1968, SRP voters approved a \$180 million bond issue, principally to finance its share of the new generating stations in which it was part owner. The City of Phoenix, soon joined by four other SRP-area cities, announced its intention to challenge this bond election on the basis that non-landowners and owners of less than one acre could not vote in SRP elections. Since the founding of the Association, the maximum number of votes in an SRP election had been around 240,000, one for each acre in the SRP area. (There were also 10,000 acres of “townsite” lands that could receive SRP water but could not vote.) Upon its formation in 1937, the District also adopted this acreage-based voting system. Votes were tied to full acres with no provision for voting part of an acre, effectively leaving owners of less than one acre with no vote. This was hardly an issue when the Valley was predominantly

agricultural because most farmers owned 40 to 160 acres. But once farms were subdivided for housing developments, almost all the resulting lots were less than one acre. Given this new reality, the cities sought to overturn the acreage system in favor of a “one landowner, one vote” system.³⁹

While acknowledging that urbanization had changed land ownership patterns, SRP management reminded the cities that the existing voting system was designed to reflect the debt encumbrance on each acre of SRP land. Although SRP paid off the original construction cost of Roosevelt Dam in 1955, each acre of SRP land still carried a lien for about \$1,200 of debt, mostly in the form of municipal bonds issued by the District. Therefore, those who owned more land had a greater financial interest in the operation of SRP.⁴⁰

SRP management proposed maintaining the acreage-based voting system but allowing the owners of less than one acre to vote their interest, however small. In exchange, SRP would concede the ownership of effluent to the cities. The two sides agreed on this compromise, and the cities supported legislation establishing fractional-acreage voting for SRP. Because the Association was a corporation rather than a state-established district, the shareholders had to approve the change in voting procedures, which they did in a December 1969 election.⁴¹

REGULATING ‘THE MONSTER’

As the 1970s progressed, inflation and fuel costs continued to rise. In order to cover these costs, APS and TEP petitioned the Arizona Corporation Commission (ACC) to allow rate increases. SRP did not have to do this since its own elected directors approved any rate increase, but its rate hikes roughly matched those of private utilities. Still, the large increases attracted negative publicity, particularly in 1975 when SRP rates, driven by rising costs, increased by nearly 50 percent.⁴² Politicians, including Arizona House Speaker Stan Akers, soon responded with concern about the governance of SRP. “We have got to determine how to grab hold of this monster,” he declared. Akers was joined by Arizona Attorney General Bruce Babbitt and members of the ACC, who proposed that they assert the right to regulate SRP’s rates and decision-making.⁴³ However, the District’s municipal status prevented the ACC and state government from exercising jurisdiction. Ultimately, the commission declined to take action.

However, state statute governed the District, and so SRP worked with the legislature to find a way to ensure that it was more responsive to its electricity customers without changing its legal status. In 1976, after considerable deliberation and negotiation, the legislature amended the statutes governing the District with the full support of SRP. The changes added four seats to the District board, to be elected at large on a one landowner, one vote basis. To stagger the terms, two seats were added in the regular board election in 1978, and two more in 1980. Not being a municipal entity, the Association Board of Governors was unaffected and remained at ten members.⁴⁴

JAMES V. BALL

While these changes were being implemented, another challenge to SRP's governance model was advancing through the courts. Among the early positions of the cities in the effluent dispute was the idea that land ownership, of whatever size, was not an adequate basis for representation in SRP elections. In July 1975, Roland James and five other Phoenix citizens, backed by the Arizona Center for Law in the Public Interest, filed a lawsuit against the District, claiming that under the acreage-based system they were "denied the right and opportunity to participate in district elections on an equal basis with all other qualified electors in the district."⁴⁵ Each plaintiff in *James et al. v. Ball et al.* (Germain H. Ball was the SRP Board member whose name appeared first in the alphabet) either rented property or owned a small parcel of land within the SRP boundaries, giving them no vote or only a fractional vote. SRP argued that because of its special and limited purposes, its elections were exempt from the one person, one vote requirement.⁴⁶

When the US District Court found in favor of SRP in March 1976, ruling that the organization's voting method was constitutional, the plaintiffs in *James v. Ball* appealed the decision, and three years later the Ninth US Circuit Court of Appeals reversed the lower court's ruling. The Appeals Court held that SRP was essentially governmental in nature and was therefore bound by the same voting rights laws as cities and other public bodies. This ruling threatened to remove control from the landowners and water users who had traditionally exercised stewardship over SRP, creating great uncertainty about its financial and administrative future. SRP successfully petitioned the US Supreme Court to review the decision, and oral arguments began early in 1981. SRP mustered a distinguished legal team, including Rex Lee (later dean of law at Brigham Young University), Jon Kyl (later a US congressman and senator), and Neil Wake of JSS.⁴⁷

In April 1981, in a five-to-four decision, the US Supreme Court reversed the Ninth Circuit Court of Appeals decision, with Justice Potter Stewart delivering the opinion for the court. The justices ruled that SRP's acreage-based voting rules were constitutional because the District's purpose was so specialized and narrow, and its activities affected landowners so disproportionately, as to release it from the strict demands of the one person, one vote principle. This decision recognized the unique status of SRP: answerable to the United States because it operates a federal reclamation project; subject to Arizona law, which created the District; responsible to its shareholders and customers, whose needs motivate the organization; and required to work in partnership with cities and other public bodies to achieve mutually beneficial ends.⁴⁸

In the tumultuous decades of the 1960s and 1970s, change was a constant for SRP as it sought to continue its core business. Power and water customer numbers continued to grow at a breathtaking rate, and in response the utility continued to build infrastructure to accommodate new growth while maintaining its existing power and water systems. However,

the pressures of growth even beyond the Salt River Valley meant that the delivery of those two essential commodities would necessitate larger, more regional networks. The CAP and new generating stations would fuel additional growth and change, but their arrival was accompanied by controversy and debate. SRP had learned a number of lessons, some more difficult than others, about the ways the company would need to adapt its internal workings to meet new political, social, and economic realities.

The economic and political climate, newfound environmental responsibilities, and changing expectations about the role of government in the lives of individuals and institutions made the pursuit of new power generation opportunities and water resources more complex. SRP's enhanced adaptive prowess would serve it well as the Valley continued its march toward modernization.



CHAPTER ELEVEN:

DECADE FOR DECISION

Despite all that had changed in the Salt River Valley in the preceding thirty years, the burgeoning Valley metropolis of 1980 still bore the marks of its small-town past. In particular, little had been done to address several serious water issues in the region. Growth was outpacing the water supply, groundwater was being pumped so fast that the earth in some areas was cracking and falling in on itself, and Phoenix was the largest city in the country without any upstream flood control structures to protect it. These oversights were partly due to slow progress in launching the CAP, the massive federal reclamation project to bring Colorado River water to central and southern Arizona, which included plans for a flood control dam at the confluence of the Salt and Verde Rivers. In anticipation of the new water supplies and infrastructure, planners paid less attention to water resource and flood protection issues during the decades-long delay in the CAP's construction. The decade of the 1980s was a time for making challenging, often difficult decisions. The collective leadership at the state and national levels worked long and hard to navigate a complex interplay of water rights, resource development, and environmental stewardship. Perhaps few anticipated that before the decade was over, there would be significant changes in the politics, laws, and economics of Arizona water. What even fewer suspected was that the water crises that precipitated these changes would not be shortages, but rather floods.

FROM DROUGHT TO RAMPAGING WATERS

From 1941 to 1965, not a drop of water flowed over the spillway of an SRP storage dam on either the Salt or Verde Rivers. In fact, the total precipitation

on the Salt and Verde watersheds declined in every decade from the 1920s through the 1950s, and this trend continued into the early 1960s. During that time, the population of the Valley had more than tripled, which meant that the vast majority of residents had never seen a sustained flow of water in the Salt River. Henry Shipley, longtime chief water engineer at SRP, noted that as a result, “Arizonans have strange perspectives. When the channel through Phoenix is dry, they call it the ‘Salt River,’ but when it’s wet they say it’s ‘flooded.’”¹

If people noticed that their comfortable farm towns had become something called “metropolitan Phoenix” or that the population of the area had grown faster than the legal and environmental infrastructure of urbanization, they were not overly concerned. Growth was changing the face of the Valley, and nowhere was this more evident than in the dry rivers that crossed it—the Salt, the Gila, and the Agua Fria. New roads were built across the riverbeds—most consisting simply of a strip of pavement, perhaps with a culvert at the center of the streambed which allowed the passage of small flows of water. Minimal investment had been put into the bridges that crossed the Salt River at major streets, and no substantial bridges were built in the Valley after World War II until the construction of those needed for the new I-10 freeway, which opened in the summer of 1965.²

Local governments, with federal help, did make progress in combating some of the most serious flooding problems. In 1959, Maricopa County created a flood control district and began working with the US Army Corps of Engineers and the Soil Conservation Service to develop a comprehensive countywide flood control plan. Once the plan was developed, Congress approved \$70 million for the construction of dams, diversion channels, and floodways across the county; the remainder of the cost was to be met locally. The list of top-priority projects included clearing brush in the Salt and Gila riverbeds below Phoenix, clearing and channelizing Indian Bend Wash through Scottsdale, enlarging the dam on Cave Creek, building a new dam at Dreamy Draw in the Phoenix Mountains, and creating a diversion channel along the north side of the Arizona Canal from central Phoenix to Skunk Creek.³ Local government officials like Phoenix City Engineer Sam Tucker understood the importance of these projects. “The way things stand right now,” Tucker warned in 1963, “we could have a major disaster from a flood coming down the Salt River.”⁴ However, not everyone was on board with these preventive measures. Hunters and the Arizona Game and Fish Department mounted opposition to the clearing of river bottom land from Phoenix nearly to Gila Bend, which would wipe out thousands of acres of bird habitat. The outdoor columnist for the *Phoenix Gazette*, Dick Lee, dismissed what he saw as a “costly boondoggle. . . . The fact that a lot of us don’t believe we are in any great danger of devastating floods means nothing to these guys—they insist on saving us anyway.”⁵ In 1965, the debate took on more immediacy as the long dry cycle ended with a series of storms that inundated the state, closing roads and causing millions of dollars in damages to homes, businesses, and farms.

THE NEW YEAR'S FLOOD

The Roosevelt and Bartlett spillways had been closed since 1941, but things were about to change. Around Thanksgiving 1965, the entire state received several days of heavy precipitation that dumped snow on the mountains and saturated the ground below the snow line. When warm, heavy rains followed and melted much of the snow, water poured off watershed slopes and produced record SRP system inflows. While a release was required at Bartlett, the Salt River system remained under control as persistent rains hit southern and eastern Arizona.⁶

The torrent that covered Valley river crossings up to a foot deep was almost entirely the result of runoff below the SRP dams. Then, late in December, the precipitation increased markedly statewide, and the new year opened with floodwaters going down the Salt River through Phoenix, closing every road crossing except the most substantial bridges, tearing out sewer and power lines, ripping up landfills, and forcing the evacuation of thousands from riverside neighborhoods. Because the heavy runoff was relatively brief, SRP reservoirs were able to absorb most of it, and the flow over Granite Reef Dam was held below river capacity and within the riverbanks. By January 3, the inflow had virtually stopped, but a small release continued for a week as SRP created a cushion for any new storms.⁷

For the next decade and a half, water flowed in the river most years.⁸ These floods revealed the need for the Valley to begin rebuilding itself as a true urban center through investments in new infrastructure: flood control channels and dams, more sophisticated weather and stream-flow information systems, and sturdy bridges over generally dry Valley rivers. However, despite the devastation experienced during the 1965–66 winter storms, voters rejected a long-delayed \$23 million bond issue that would have triggered federal funding for Valley flood control projects. The vote indicated that the citizens of Maricopa County still did not feel particularly threatened by flooding, and the interplay between water and transportation infrastructure challenged local politicians, planners, and engineers for years. The comprehensive program drafted by the US agencies and the flood control district was shelved, though a few individual components with strong local sponsorship, such as Dreamy Draw Dam and the Indian Bend Wash floodway, were completed.⁹ Cities built less costly replacement bridges to replace those that had just washed out, believing that the construction of a flood control dam at the confluence of the Salt and Verde Rivers was imminent. “We were gambling the dam would eventually be in place and our bridges would then be adequate,” said a Maricopa County engineer.¹⁰

For a number of years, popular belief in the status quo seemed justified. Water flowed over Granite Reef and down the Salt River through the Valley in 1967, 1968, 1970, 1972, and 1973, and though river crossings were occasionally blocked, there was no significant damage.¹¹ What few appreciated was that Arizona weather had entered a wet cycle. In 1978, the weather change announced itself in memorable fashion.

‘WE MUST BE PREPARED FOR THE UNTHINKABLE’

The winters of 1976–77 and 1977–78 produced almost no precipitation in the form of either rain or mountain snow. At the start of 1978, SRP reservoirs held only about 500,000 acre-feet of water when a series of significant flood events occurred, triggering all the same problems the Valley had seen more than a decade earlier. The population had doubled again since 1960 to well over one million, and many people remained apathetic about flood control and resistant to increased taxation. Metropolitan Phoenix was paying the price for years of underinvestment in infrastructure; the Maricopa County Flood Control District had never been able to implement its comprehensive program, and no other agency had stepped in.

SRP repeatedly explained that it had no legal charter to control flooding, nor were its dams designed to do so. Unlike SRP’s storage dams, a flood control dam would have the ability to release a large amount of water from the bottom of the reservoir, and its operators would always try to reserve most of its area to catch destructive floods, not to store water. Yet, despite the legal and technical hindrances, SRP played a leading role in managing emergency flood situations, exploring ways to improve emergency preparedness in the mid-’60s. In 1978, it set up an emergency coordination center in its administration building to evaluate weather conditions and recommend a course of action to prevent damaging flooding. While SRP strove to provide leadership when central Arizona was in flood crisis mode, there simply were not adequate protocols in place to facilitate an effective and coordinated response among the key players.¹² New governor Bruce Babbitt, sworn in on March 4, 1978, faced his first crisis with the flood. After the waters subsided, Pfister met with the governor and other groups about the need for improved preparedness.¹³

After three destructive flows in a little more than a year, the Arizona legislature in 1979 approved \$25 million in flood control projects, which included two substantial bridges in the Valley, river channeling around Sky Harbor Airport, and clearing of the Salt and Gila channels from 91st Avenue to Gillespie Dam.¹⁴ Simultaneously, SRP analyzed flood control operations across the country and commissioned several studies on historic rainfall and snowfall records.¹⁵ These collective efforts to address flood management in central Arizona had just begun when the next flood—the most devastating of the era—hit in February 1980.

A catastrophic scenario appeared likely when a heavy rain began falling on Valentine’s Day 1980, followed by a second strong storm two days later, with an even larger storm predicted to hit the state as early as February 19. For the second time, Governor Babbitt took over coordination of the emergency response. He appeared on television to warn the public that if rainfall continued as predicted, there was a real possibility that Stewart Mountain Dam could fail and as many as 200,000 people would need to be evacuated. His report was alarming: “I don’t know if it is going to happen, but I think we must be prepared. We must be prepared for the unthinkable.”¹⁶

Meanwhile, SRP workers operated the dams in hazardous conditions. “There was water

around the dam site in places we've never had water before," said Bartlett gate operator Frank Leach.¹⁷ Water began seeping into the Horse Mesa and Roosevelt powerhouses, reaching the electrical equipment inside and forcing crews to evacuate to safer locations. Wilber Thrash spent a sleepless Friday night with his construction and maintenance crew in a spillgate engine room at Horse Mesa Dam. "We were soaked from the rain and water splashing over the spillways," he said. "The worst part was the tremendous noise of water being released, the arcing effect, and the shaking of the dam. It was the most frightening experience I've ever had in my life."¹⁸ Roads to most of the dams washed out, after which all transport was by helicopter. Water releases from the dams peaked at 180,000 cubic feet per second—the largest controlled flow ever to go down the Salt, and an amount exceeded only by the catastrophic 1891 flood.¹⁹

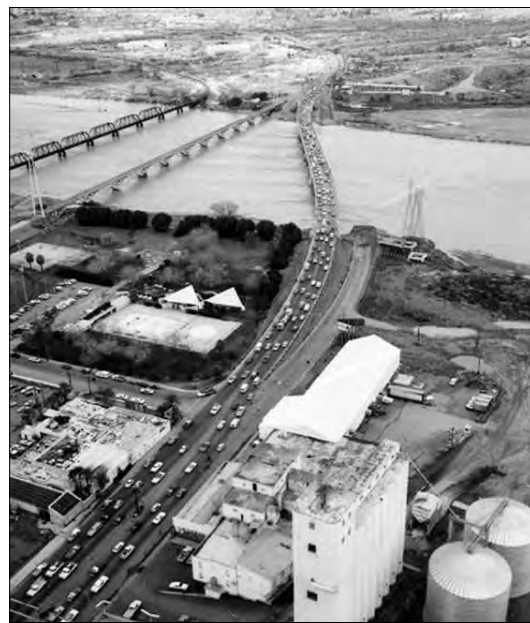
Thankfully, the second and third storms were less forceful than expected. None of SRP's dams failed, but water continued to flow at a high rate for weeks. The damage to roads, power lines, sewage systems, farms, and businesses was unprecedented. Again, the Valley's river crossings were restricted to two bridges. On February 20, sunny skies returned, but the danger continued. The continuing river flows off the watershed undermined the Indian School Road Bridge over the Agua Fria River, which collapsed only an hour after it was closed to traffic. The flooding caused \$70 million in damage across the state, including \$6 million in damage to SRP facilities. Estimates indicated that the flooding and traffic restrictions temporarily put 40,000 people out of work.²⁰ In any event, the apathy that had plagued the community was washed away.

ORME DAM

Following the collapse of Idaho's Teton Dam in 1976, Congress passed the Reclamation Safety of Dams Act, establishing new standards for protection from earthquakes and catastrophic storms. The safety issues raised by the floods of 1978 and 1980 led to a renovation



Stewart Mountain Dam with spillway gates wide open to release floodwaters of the Salt River, 1978



Tempe Bridge over 1980 flood

of the SRP dam system that was as extensive and costly as the original construction. It was not to be a simple process.

Since the first USBR engineering studies in the 1940s, the CAP had included a dam at the confluence of the Salt and Verde Rivers to receive and store Colorado River water. The prospective dam, named for early SRP President John P. Orme, was also intended to intercept Salt and Verde floodwaters before they reached Phoenix. By the 1960s, Orme Dam had become a focus of concern, and letters opposing the dam and castigating the CAP began to appear in Phoenix newspapers. This was the first time an organized opposition to the CAP had appeared in Arizona. In 1973, Citizens Concerned About the Project (CCAP), formed to lobby against the CAP, immediately focused on Orme Dam as “the worst part” of the project.²¹ Dam opponents questioned its flood control benefits and expressed concerns that the reservoir formed by the dam would have a negative impact on the Fort McDowell Indian Reservation, a valuable natural habitat and a longtime favorite river recreation area. Some of the most active supporters of the CCAP were younger people who valued the river-tubing portion of the Salt.²²

One of President Jimmy Carter’s first acts upon taking office in 1977 was to suspend funding for nineteen federal dam projects, including the CAP, pending an economic and environmental review. This unexpected decision was made at a time when drought conditions existed in most of the Midwest and West. The government had already appropriated nearly \$400 million for the CAP (the total cost was then estimated at \$1.6 billion). Arizona Rep. John Rhodes clearly was surprised: “I don’t have a thing to say. . . . I don’t believe it.”²³ It did not take long, however, for the state’s Republicans and Democrats to rally around the CAP flag, as they had been doing since the project’s proposal in 1924. A few weeks later, Arizona politicians and business leaders presented their case at an Interior Department hearing. Rep. Morris Udall led the group, and Jack Pfister recalled, “He did a magnificent job. I was just spellbound by his presentation.”²⁴ By April 1977, CAP funding had been restored, but with the requirement that Orme Dam be reevaluated and compared to other alternatives.

The exploration of Orme alternatives was soon combined with the ongoing Safety of Dams study. In July, the USBR and the Army Corps of Engineers agreed to conduct a joint study of these issues, known as the Central Arizona Water Control Study. This was the first comprehensive assessment of every dam and water control issue in the region, and local water interests as well as the public had input through an advisory committee headed by Governor Babbitt. Gradually, the study developed several elements that could be used in different combinations to improve dam safety and flood control and accomplish the storage needs of the CAP. The study grouped various elements into seven different plans, and then considered the feasibility of each on its merits. The basic difference was whether a large “confluence” dam like Orme or a new and much larger Waddell Dam would form the primary holding reservoir for the CAP water.²⁵

Orme Dam had several advantages over Waddell, one of which was glaringly apparent

during this period—it could capture the large flood flows that came down the Salt. Although the Agua Fria River does flood above the Waddell Dam site, it does not produce anything near the flow of the combined Salt and Verde Rivers. Every gallon of central Arizona spillwater that could be impounded meant a gallon of water that would not have to be pumped, at great expense, from underground or from the Colorado River. Orme also already had Congressional approval in the 1968 CAP authorizing bill. However, Orme Dam had become politically controversial. The Fort McDowell Indian Community took a strong stand against the dam, which would inundate houses and reservation farmland. By the summer of 1981, SRP concluded that any dam at this location was not politically viable, regardless of its strengths from a flood control standpoint. In November 1981, Secretary of the Interior James Watt followed the recommendations of the governor's advisory committee and chose Plan Six, which called for the construction of Waddell, rather than Orme, and included plans for a smaller flood control structure—Cliff Dam—on the Verde River.²⁶

GROUNDWATER MANAGEMENT

As construction crews pushed the CAP canal slowly toward Phoenix, it became apparent that far from being a panacea, the new project demanded major changes in Arizona water policy, many of which were propelled by a new kind of discussion. Arizona had always presented a united front in fighting for the CAP, but once Congress approved the project, dissenting voices challenged its costs, benefits, and value. Before the end of the 1980s, Arizonans considered and then rejected three different plans for their use of Colorado River water. In the process, the flood control and water storage systems evolved substantially, and the politics of water grew more contentious and more inclusive.

While SRP was not expecting to be a major recipient of CAP water—it planned small allocations for its farmers and for future needs in cooling generating stations—it was a strong proponent of forward-thinking resource development for future generations. SRP was uniquely positioned to help achieve consensus among the state's water interests because of its long history of involvement in the issues and the wealth of knowledge and expertise at its disposal. The organization played an important role in every water controversy and policy development during what General Manager Jack Pfister dubbed a “decade for decision.”²⁷

SRP was designed to bring water to farmers of the Phoenix area and was one of the first reclamation projects undertaken. A great deal of its success was a product of the time and the place it was built; the legal and political conditions were as ideal for success as the topography and climate. The CAP was the last great reclamation project of the twentieth century—and the most expensive. By the time it was built, things had changed.

When originally conceived in the 1920s, the CAP aimed to expand irrigated agriculture. By the time it was finally authorized, however, it had become essentially a means to lessen dependence on groundwater. While the project languished in legal and political limbo for

decades, agriculture expanded in large part due to the availability of water pumped from ever-deeper wells. The thirsty cities and towns that continuously grew across Arizona's arid lands also turned to groundwater for municipal needs. The 1948 groundwater code was ineffective in regulating pumping, and no further attempt had been made to control the use of wells. "The CAP," Governor Babbitt later recalled, "would be a hollow victory unless we used it as a springboard for good water management in Arizona."²⁸

In September 1979, Secretary of the Interior Cecil Andrus reinforced this outcome when he announced that he would not allocate any CAP water until Arizona enacted legislation to control the use of groundwater.²⁹ The announcement put tremendous pressure on the state commission that had already been meeting for two years but had been unable to break the historic deadlock over groundwater regulation.³⁰ Farmers, who accounted for at least three-quarters of the water use in Arizona, were unwilling to cede control of this vital resource to bureaucrats in Phoenix—or anywhere else. But the political geography in the late 1970s was substantially different from that of the 1940s and 1950s, when local farmers enjoyed strong political influence in the state legislature. By the 1970s, Arizona's political leaders were much more in tune with the need to reserve water for the long-term development of cities and businesses. Now the cities, with mining companies their frequent allies, were able to force a compromise with agricultural interests.

Following the secretary's announcement, a new effort to reach a consensus began. Representatives of agriculture, the cities, and the mining industry formed an unofficial subcommittee.³¹ SRP's Leroy Michael and Jon Kyl of JSS took active roles in representing agriculture. Governor Babbitt personally led the group, which began meeting around Thanksgiving 1979. For the next six months, they worked to achieve consensus—or at least compromise—on the difficult issues facing Arizona.³²

In June 1980, the Arizona Legislature took up the Groundwater Management Act in a special session. The legislature understood that any amendments might destroy the complex compromises that were the heart of the act, so the bill passed with no changes and little debate. The new law established a framework for managing the underground water supply to the satisfaction of the Secretary of the Interior, thus lifting delays on moving forward with the CAP. A new state agency, the Arizona Department of Water Resources (ADWR), was given broad powers to control groundwater withdrawal in four Active Management Areas (AMAs) in Prescott, Phoenix, Tucson, and Pinal County, which were the heart of both population growth and agriculture in the state. Existing groundwater uses were largely grandfathered, but new uses would require permits from ADWR. New developments were required to prove a 100-year assured water supply not dependent on new pumping. The goal was to achieve safe yield (i.e., no further groundwater depletion) in the AMAs by 2025. Babbitt turned out to have been more of a driving force than even the group participants realized: several years later, he admitted that the Secretary of the Interior delivered the ultimatum at his request.³³

UPFRONT FUNDING

The 1981 decision to endorse Plan Six signaled forward momentum but not the end of controversies related to the CAP. Massive public works projects were no longer popular. From the 1930s through the 1960s, the federal government used such projects to build the national industrial and agricultural infrastructure and was rewarded with steady economic expansion. By the mid-'70s, however, spiraling federal deficits forced tighter control over such developments, and new political forces, particularly the environmental movement, shined a much brighter light on their potential drawbacks. Another policy of the Carter administration, continued by his successor Ronald Reagan, was the concept of local cost sharing on federal projects. The requirement that entities benefiting from a federal project contribute to a portion of the upfront construction costs was intended not only to save federal dollars, but also to weed out projects with insufficient local support.

Of course there was no question of Arizona's commitment to the CAP after half a century of battle. Plan Six, however, was much more expensive than the discarded alternatives: initial estimates were that the project would cost a little over \$1 billion.³⁴ While Plan Six continued to receive political support at the federal level, significant local funding would be necessary to ensure the project would move forward.

In 1982, Governor Babbitt convened a task force to develop local funding options. The question of how to pay for—or rather, *who* would pay for—the various elements of Plan Six proved difficult enough. Cities wanted flood control and new surface water storage. SRP and the USBR wanted safety renovations on the existing dams. The Central Arizona Water Conservation District (CAWCD), tasked with repayment and management of the CAP on completion, was wary of adding dam safety or flood control costs to the already massive bill.³⁵

The financial issues were complex. Questions of which dollar bought which foot of dam height and which acre-foot of storage were hotly contested. Tom Clark, CAWCD general manager, said the negotiations “were painful and broke many threads of the ‘Arizona water unity’ which had been in place for years.”³⁶ House Majority Leader Burton Barr summed up the tenor of the debates: “I would say there is a complete lack of trust among everyone involved.”³⁷ Even so, a deal was struck. In April 1986, Secretary of the Interior Don Hodel announced a cost-sharing agreement for approximately \$350 million in non-federal financing for the Plan Six facilities of the CAP. The CAWCD committed to pay \$175 million of the local money; the Maricopa County Flood Control District, \$63 million; Valley cities, another \$49 million; and the Salt River Project, \$42 million. With this agreement, local entities not only assured the timely completion of the CAP but also gained some control over design decisions and construction priorities.³⁸

FINAL STEPS FOR PLAN SIX

CAP opponents shifted their focus to Cliff Dam, this time with a focus on the Endangered Species Act. The Cliff reservoir would inundate several miles of the Verde, a stretch of the

river that was an important nesting and hunting area for bald eagles.³⁹ Even more than the fight against Orme Dam, this effort received high priority from a coalition of national environmental groups. In 1985, a lawsuit to block construction of the dam, which claimed that the reservoir would destroy the fragile breeding ground of bald eagles, was filed in US District Court.⁴⁰ Soon thereafter, Secretary Hodel reported that the US Fish and Wildlife Service had determined that the area's bald eagles could be protected "so long as reasonable and prudent alternatives are followed."⁴¹

Preparations for Plan Six continued, and by January 1987, negotiations to settle the 1985 lawsuit out of court moved forward as well.⁴² However, within days, Cliff Dam opponents released an Interior Department report stating that because of Plan Six cost increases, the project would require new congressional authorization. "Plan Six is dead in the water," claimed Lynn Greenwalt of the National Wildlife Federation.⁴³ Arizona's congressional delegation countered that any issues raised in the report had been resolved and that the Interior Department still had the authority to continue with Plan Six.⁴⁴

By May it was evident that a congressional coalition was building to undermine the CAP, Plan Six, and Cliff Dam in particular. Over a period of several days, representatives of Arizona water interests and the state's US senators and representatives tried to rally support for Plan Six as written. When it appeared that Arizona did not have the votes necessary for passage, Arizona's congressional delegation made a deal with dam opponents and Cliff Dam was dropped from Plan Six in exchange for dismissal of the lawsuit and an end to threats to stop Plan Six and the CAP altogether. While some Arizona interests were bitterly disappointed at the loss of Cliff Dam, others saw the compromise as a decisive victory.⁴⁵ Senator John McCain said that, nevertheless, a way would be found to replace the cities' lost benefits, in which case they should not care if they "have a dam or a banana."⁴⁶ A few days later, Congress approved a record \$237 million appropriation for the CAP.⁴⁷

With this vote, the completion of the CAP and the rest of Plan Six seemed assured, but a related matter was still in dispute. In 1980, the legislature had created the Rio Salado Development District to promote economic development, recreation, and flood control in the 20,000-acre Salt River bed, which passed through the Phoenix metro area from Granite Reef Dam to the confluence of the Salt and Agua Fria Rivers.⁴⁸

The original Rio Salado project dated back to 1966 when ASU architecture students combined flood control and environmental design in a plan to convert the undeveloped riverbed into a major asset for the rapidly growing Valley.⁴⁹ Within a few short years, developmental plans incorporated commercial and light industry into the design, and recreational uses grew to include a new state fairground and a 75,000-seat domed stadium. These elaborate plans depended upon the planned upstream CAP-related flood control efforts.⁵⁰ A flood channel through the development would allow the passage of only 55,000 cubic feet per second, making it clearly contingent on flood control from either Orme or Cliff

Dam. This connection brought the Rio Salado project under fire from the CAP opposition. As other justifications for Cliff Dam fell away, its opponents charged that the dam was a backdoor subsidy for the channel development, which they derided as “a billion-dollar, taxpayer-funded playground for real-estate developers.”⁵¹ When Cliff Dam was eliminated from Plan Six, negotiations quickly followed with Rio Salado developers to keep buildings outside the existing 100-year flood plain and to increase the flood channel capacity of the project. Facing a November 1987 election for a property tax increase to fund the project, the Rio Salado District sought to neutralize opposition by agreeing to both conditions, in return for which environmental groups dropped their objections.⁵² However, voters perceived the financial arrangements and water supply of the project as dubious and soundly defeated the Rio Salado development in the election. Maricopa County citizens outside of the Phoenix metropolitan area were not inclined to support a Valley-centered tax initiative that provided little value to them.⁵³ “Few issues in Arizona of late have taken the lambasting voters gave the ill-fated Rio Salado,” noted the *Mesa Tribune*.⁵⁴

This defeat brought to a close the “decade of decision” on Arizona water projects. Before 1980, Valley leaders had somewhat blithely assumed that the CAP would solve all the water problems of the state. A series of unrelated events—the collapse of Teton Dam in Idaho, the Salt River floods of 1978 through 1980, spiraling federal deficits and consequent budgetary belt-tightening, the simultaneous rise of an organized opposition to the CAP, and a governor able to lead fractious interest groups in a new direction—created both the need and the resources to completely reevaluate water use and management in central Arizona.

Tempe Town Lake

The morning after the Rio Salado bond issue was soundly defeated, Mayor Harry Mitchell announced that despite the countywide project's failure, Tempe (where the bond issue had gained 52 percent support) would be proceeding with its own version of Rio Salado. An ambitious plan involving a series of lakes, riparian areas, and natural habitats evolved over several years into a single large “town lake” with shoreline amenities. The project enjoyed several advantages that the larger Rio Salado project did not: 90 percent of the five-mile stretch of riverbed in Tempe was owned by city, state, or federal entities, including ASU and SRP, which streamlined the planning and land acquisition process. Also, the Arizona Department of Transportation's ongoing construction of the Loop 202 Freeway immediately north of the river offered the opportunity for the city to provide rock and gravel needed for construction from the riverbed, resulting in its channelization and bringing the entire project inside the bounds of the 100-year flood plain.

Funding for the project came from the sale of bonds against the 1993 sales tax increase in Tempe, meaning that the project was spearheaded by the city council without a direct referendum. Despite some opposition, the project was completed in 1999 as the lake filled with CAP water transported via SRP's Grand Canal.



CHAPTER TWELVE:

CYCLES

By the mid-1980s, the impending completion of the CAP and the flood control and water management facilities of Plan Six seemed to promise that water issues would not impede the continued growth of the greater Phoenix metropolitan area. The completion of PVNGS and the coal-burning power plants of the Colorado Plateau likewise ensured that the electric power system was ready for sustained development in the region. SRP had assumed a prominent position in the water affairs of the state and had become a billion-dollar electric power utility serving a large part of the Phoenix metropolitan area. However, as always, there was more work to be done as SRP and the Valley headed for the new millennium. New challenges lay ahead in the form of implementing the improvements of Plan Six, the specific apportionment of the water supplies brought by the CAP, and fundamental changes to the nature of the electricity industry. These called for creativity, adaptability, and, at times, painful readjustment for both the water and power sides of SRP's business.

INDIAN WATER RIGHTS

The Salt and Verde watersheds include several Indian reservations, all of which have potential claims to the water of the rivers SRP shareholders have relied on for so many years. In 1908, the US Supreme Court first considered Native American claims in *Winters v. United States*, in which it decided that Indians on Montana's Fort Belknap Indian Reservation possessed what it called "reserved rights" to the water of the Milk River. When the federal government created the reservation, the court held, it intended that the inhabitants would support themselves by farming, and since successful farming in that area

required irrigation, the government implicitly reserved all the water needed for that purpose from the nearby river. This reserved right dated from the creation of the reservation and therefore was superior to many of the non-Indian appropriations on the river, regardless of whether the Indians had actually used water for irrigation or not. Because most reservations in the West were created under similar circumstances, the ruling in the *Winters* case potentially had implications for Indian water rights in every western state. However, the general application of the reserved rights principle remained untested through the first half of the twentieth century.¹

The 1963 Supreme Court decree in *Arizona v. California* was as monumental for western states as any legislation of the period, for although the court refused to adjudicate the water rights of any Indian reservations other than the five Arizona and California reservations adjacent to the Colorado River, it affirmed the principle of reserved rights. The court also created a standard for determining the quantity of reserved water rights by basing them on the “practicably irrigable acreage” of an Indian reservation. By this rule, a tribe had the right to enough water for all the land that *could be* irrigated on the reservation, even if none of the land had ever been irrigated. This represented a potentially huge amount of water on some reservations.²

It was the possibility of a Supreme Court ruling on the water rights of virtually all Arizona Indian reservations that caused the BIA to veto the 1956 agreement between SRP and the White Mountain Apache Tribe over the tribe’s impoundment of water for fishing lakes. When the Supreme Court declined to quantify Indian water rights on the Salt River, the tribe continued to dam tributary streams on the Fort Apache Indian Reservation while SRP sought an effective means to halt this practice. SRP claimed that the 1910 Kent Decree—which had decided the relative water rights of all the lands in the Salt River Valley—had in effect apportioned all the water of the Salt River, and that by simply reopening the case of *Hurley v. Abbott*, all the water rights on the upper reaches of the river could be adjudicated. US attorneys representing the tribe maintained that any adjustment of Salt River water rights would require an entirely new legal action that included every individual water user on the river. In July 1966, a judge dismissed the SRP attempt to reopen the previous case, ruling in favor of the federal position that all water users must be party to the action. Although it was obvious that the legal proceeding would be much larger and more arduous than originally envisioned, the SRP board authorized proceeding with an expanded suit.³

As legal preparations proceeded, so did negotiations. Through 1968 and 1969, detailed studies were carried out to determine the amount of water available and the effects of storage, transmission, and different types of uses. By now the discussions included all the other reservations on the upper watershed: the San Carlos Apache Reservation that borders the Black River (though most of its area drains to the Gila River) and the small Yavapai reservations at Camp Verde and Prescott. Though protracted, the negotiations went so well

that SRP stopped its lawsuit preparations. In November 1969, the Indian communities, SRP, and the local BIA office reached an agreement, but by the time the government was prepared to approve it in 1972, the tribes were expressing dissatisfaction.⁴

Still determined to protect its upstream water rights, SRP tried a different tack, this time filing a petition with the State Land Department to determine the conflicting water rights across the entire watershed. These petition filings (in 1974 for the Salt River and in 1976 for the Verde River) led to court battles over whether the state had the authority to adjudicate water rights for federally created Indian reservations. In 1979, the legislature amended the Arizona statutes to establish the framework for federal inclusion in a state adjudication of water rights. Fearing that state courts would never recognize their federal rights, Indian tribes sued to adjudicate in federal court. While this suit was pending, the legislature passed the Arizona Groundwater Management Act in 1980, creating the ADWR and empowering it to administer a state court adjudication. After the US Supreme Court ruled that the state had jurisdiction in the matter, the adjudication proceeded in state court. The groundwork was laid for what became the General Stream Adjudication of virtually all the surface water in Arizona, a process with the potential to settle many of the vexing questions of water rights and water use in the state. The adjudication required that all users of river water on the Gila and Little Colorado River systems state their claim to water under state or federal law and have it judged by the court. The Salt and Verde Rivers were included under the Gila River.⁵

Because of its experience in water management, SRP became a leading source of technical information and legal initiatives among the contesting parties. In 1977, General Manager A. J. Pfister also assigned longtime land agent Paul Weimann to assist the lawyers with factual and historical investigations on water rights, and the success of this effort eventually led to the creation of a permanent division of the company devoted to historical research and analysis, Research Archives.⁶ The ensuing General Stream Adjudication, initiated on the Gila River system in 1974 and later extended to the Little Colorado River system, opened a lengthy period of water rights litigation.

INDIAN WATER SETTLEMENTS

As the adjudication commenced, it became clear that the claims of Indian communities for appropriable water in the state represented the single most important issue in resolving the claims of all water users. Because the water rights of Indian and non-Indian communities were based on different legal precedents, resolving the claims of Indian communities was necessary to provide certainty to non-Indian water users. However, litigating tribal claims was a time-consuming and costly proposition and one that carried high stakes: some water users could lose their supplies entirely. A negotiated settlement offered a more promising avenue to achieve a workable allocation of water supplies while ensuring that all stakeholders could maintain their livelihoods.

SRP took a leadership role, in partnership with the federal government, cities, and agricultural users, in seeking the settlement of tribal water rights in Arizona. The first of these settlements, with the Salt River Pima-Maricopa Indian Community (SRPMIC), was reached in January 1988. A key component of the agreement was that the community received much-needed financial support to put their water to use for irrigated agricultural and industrial development. Along with a federal allocation of funds, Valley cities and local water users agreed to allocate portions of their existing water supply to satisfy SRPMIC claims. In all, the settlement represented the value of the water rights plus an appropriation of approximately \$200 million for the tribe to defray land improvement and water delivery costs. SRP, local municipalities, and irrigation districts avoided the expense of a lengthy trial and helped assure their existing rights to the Salt and Verde Rivers. The agreement included a federal appropriation to the tribe requiring congressional approval, and President Reagan signed the legislation into law in October 1988.⁷

The SRPMIC settlement was a model for similar agreements with the Fort McDowell Indian Community in 1993, the San Carlos Apache Tribe in 1999, and the Zuni Tribe (on the Little Colorado) in 2002. Much more difficult negotiations took place with the Gila River Indian Community (GRIC). The GRIC claim, the largest to the Gila, Salt, and Verde Rivers, was a serious threat to the established water rights that SRP represented and a looming challenge for the future growth of the Valley. SRP was deeply involved in both court proceedings and settlement talks with the GRIC. In late 2002, federal legislation authorizing a settlement was introduced in Congress which would award 653,500 acre-feet annually to the reservation, along with more than \$200 million in federal funds to renovate the water delivery system and help pay the cost of CAP deliveries. In exchange, the largest single claimant in the statewide adjudication withdrew past and future claims to river water and groundwater.⁸

GROUNDWATER AND GROWTH

Just as the General Stream Adjudication sought order in the use of surface water, another process was intended to assure the long-term reliability of groundwater. The Arizona Groundwater Management Act of 1980 created the ADWR and charged it with finding ways to gradually reduce the pumping of groundwater in the central part of the state where the water table had dropped dramatically. In these areas, ADWR was given a goal to manage the groundwater system to “safe yield;” that is, a rate of pumping equal to the annual replenishment of the aquifer. The department was to develop successive management plans for each decade that would gradually reduce the overdraft of groundwater until safe yield was achieved by 2025. Water needed for growth was to instead come from the CAP, conservation, use of reclaimed water, and conversion of agricultural lands with surface water rights.⁹

As part of the Groundwater Management Act, new development was required to prove it

had a hundred-year assured water supply that did not rely solely on groundwater from new wells, but also the development and use of non-groundwater sources.¹⁰ New neighborhoods that happened to be in SRP's water territory maintained the water rights of the farms they replaced, but much of the Phoenix area's development frontier lay in the east and northwest Valley, areas that historically had relied on groundwater.

Under the new law, rural areas of the state did not face the same pumping restrictions nor were there many hindrances to the withdrawal and transport of groundwater. Consequently, growing Arizona cities looked to those areas as potential future water sources. In the 1980s, the concept of transferring water was put to the test as several of the larger cities purchased tracts of rural Arizona land dubbed "water ranches." These sites were often large farming areas, but they did include forested and undeveloped lands as well, all with surface or groundwater rights that could be assumed by the municipality. Rural communities protested that transferring water from their area would threaten the supply and quality of their water resources and hurt their economies by taking farmland out of production or harming timberlands and tourism. Moreover, rural municipalities and counties faced a loss of tax revenue, because a water farm owned by a city, for example, could not be required to pay property taxes to a distant county. By the end of the 1980s, Arizona policymakers were still grappling with water transfer issues.¹¹ In 1991, the state legislature passed the Groundwater Transportation Act, which forbade new water transfers but grandfathered the investments already made by Valley cities.¹² Economics, however, played a much larger role in limiting water transfers. It turned out that operation and transmission costs were as much as three times the cost of CAP water.¹³

SRP was able to offer an alternative solution. Based on experimental work in groundwater recharge, SRP could provide a means to store water underground for future use. In cooperation with the USBR and a number of Valley cities, SRP had already built a system for the CAP canal to connect to SRP's canal system east of the Valley near Granite Reef.¹⁴ In the early 1990s, SRP proposed construction of the Granite Reef Underground Storage Project (GRUSP), which could take SRP or CAP water and recharge it into the ground. After the state legislature created the laws allowing cities and other water users to establish recharge credits to offset future pumping, SRP

GRUSP field with full basins, aerial view looking west toward Granite Reef Diversion Dam



CAP-SRP Interconnect Facility

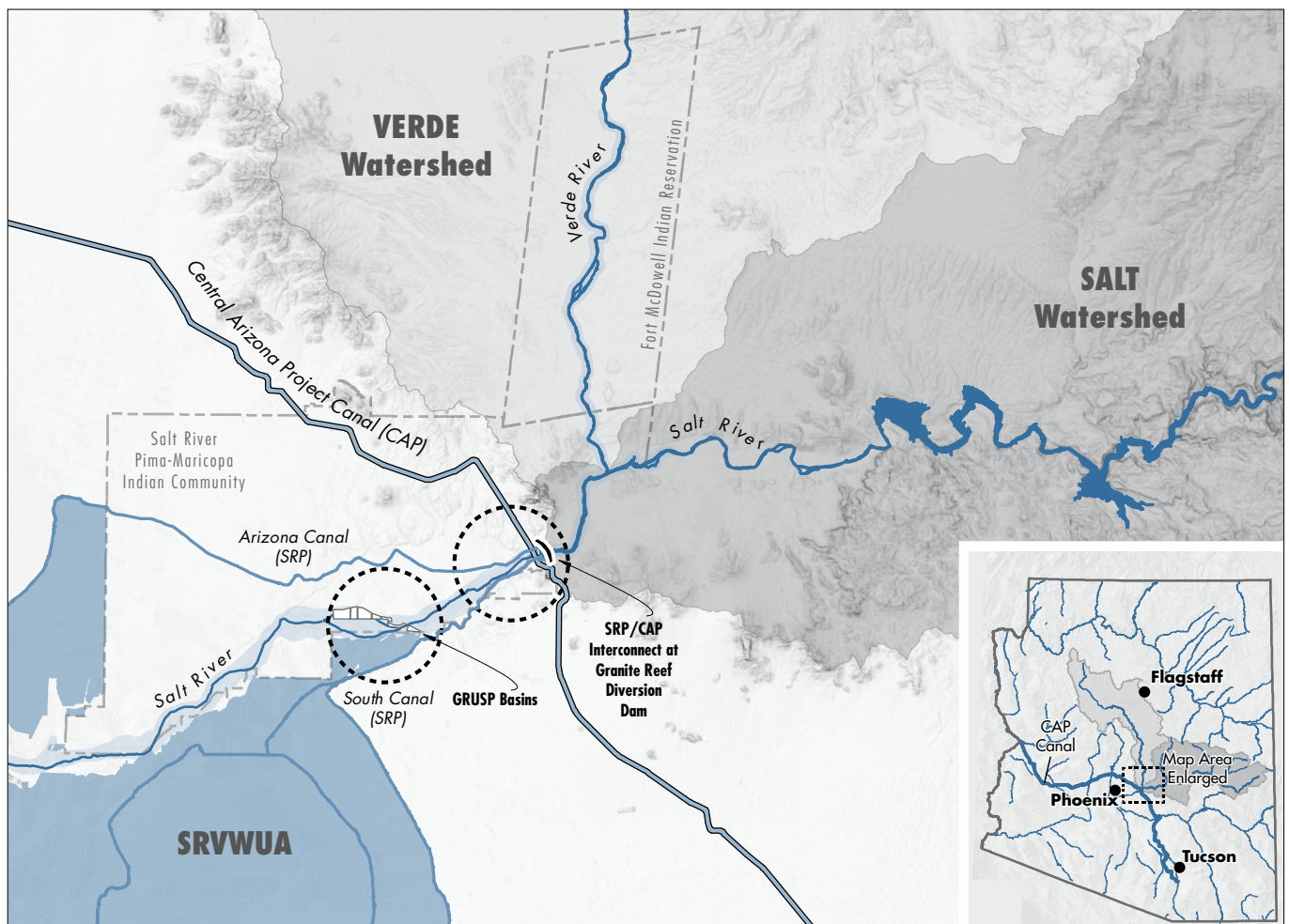
In 1979, SRP and a number of Valley cities began discussions aimed at finding a way to distribute Colorado River water arriving in the area via the new CAP aqueduct. The most economical and convenient solution was to make use of SRP's existing canal system by tying it into the CAP system. Planning and negotiation sessions involved SRP and dozens of cities and other water interests. In 1984, the SRP Board approved the design of an interconnection facility at Granite Reef Diversion Dam, where the CAP aqueduct would pass beneath the Salt River.

The CAP-SRP Interconnect Facility (CSIF) was completed in 1990. The CAP canal siphons were located under the Salt River just downstream from the dam. Immediately after the siphon passes Granite Reef, there is a turnout from the CAP aqueduct that connects to SRP's Arizona and South Canals. The CSIF allows cities and other users in the metropolitan area to accept CAP water via the SRP canal system. The interconnect also served as a necessary first step in developing the ability to replenish groundwater supplies by recharging water at GRUSP. This link between one of the nation's first reclamation projects (SRP) and one of its last (CAP) provided even more flexibility and certainty in water management for the greater Phoenix metropolitan area.

and several Valley cities entered into a lease agreement with the SRPMIC to build four large basins in the riverbed and a delivery canal that could carry water from the South Canal.¹⁵ The facility was permitted by ADWR to recharge water through the porous gravel of the Salt River bed for future recovery.¹⁶ Since its opening in 1994, SRP has delivered over 1 million acre-feet of water to GRUSP—an amount equivalent to 60 percent of the capacity of Roosevelt Lake. The same year SRP celebrated the tenth anniversary of GRUSP, the company announced plans to partner with Valley cities, most on the west side, to develop a second underground storage facility, the New River-Agua Fria River Underground Storage Project (NAUSP), near the tail of the Grand Canal.¹⁷

Water banking was expanded in 1996 when the state legislature created the Arizona Water Banking Authority. Arizona cities and farms had not been using their full allotment of CAP water, and California had been taking advantage of the unused Colorado River supply. Arizona water interests feared that if the state did not begin using its entire CAP entitlement it might lose some of it to California permanently. The water banking law allowed the state to take as

CAP-SRP Interconnect Facility and GRUSP basins located at the east end of the Valley



much of the unused allotment as it could to fully utilize the state's entitlement of Colorado River water by storing the water in recharge facilities like GRUSP.¹⁸ The concepts of banking water and of exchanging recharged water for water pumped elsewhere have contributed significantly to reducing groundwater overdraft.¹⁹

REDEDICATION

SRP and other Valley interests worked long and hard in the 1980s to resolve issues related to CAP water storage and distribution, flood control, and dam safety. The centerpiece of their efforts to secure Plan Six improvements, at least as far as SRP was concerned, was the reconstruction and enlargement of Roosevelt Dam. Plans included raising the crest of the dam seventy-seven feet, approximately fifteen feet of which was intended to increase the Valley water supply by 304,729 acre-feet. The rest of the new height of the dam, creating a total of 1.8 million acre-feet of new capacity, was reserved for flood control space.²⁰ During the eight years of construction, additional dam safety modifications were also underway at Horseshoe and Bartlett Dams on the Verde River and Stewart Mountain Dam on the lower Salt River.²¹

Originally, a single-lane road, State Highway 188, ran across the crest of Roosevelt Dam connecting Globe with Payson. The new Roosevelt Dam was designed without a crest road, so before construction could begin, it was necessary to construct a bridge one-quarter-mile upriver from the dam. The unique design of Roosevelt Bridge incorporated a single arch that starts and ends below the roadway then launches skyward 156 feet. When completed in 1990, it was the longest of its kind in North America.²²

The USBR began construction on the dam after the original light globes had been removed from the parapets along with an eighty-foot section of quarried granite that was donated to Valley museums. The top two feet of the dam were removed, and the entire face was covered with concrete ranging in thickness from ten to fifty feet. When the water line drops low enough, the original stonework is still visible on the back side of the dam below the extension. The new spillways were deeper and narrower than the originals, allowing for larger water releases before and after the high point of a flood. A new lake tap was tunneled under the dam, allowing the release of 11,500 cubic feet per second during construction and later increasing water release capability.²³

The bane of the original builders of Roosevelt Dam had been the weather. The start



Roosevelt Bridge completed, view looking toward the back of Roosevelt Dam

of construction in 1904 coincided with the end of the extended drought that had been partly responsible for the dam's construction, and floods repeatedly interrupted work. The story was remarkably similar during the reconstruction of the dam, which began in 1987. While meteorologists reported that the El Niño effect was responsible for years of record rain, many at SRP dubbed it the "Theodore Roosevelt Dam jinx."²⁴ Beginning in 1991, high levels of precipitation on the Salt River watershed quickly filled the reservoir, which had seen its capacity reduced by nearly a third to accommodate construction activities.²⁵ The following two years unleashed waves of wet storms, and in 1992, SRP experienced the longest continuous release of surplus water in its history. Remarkably, January 1993 was the wettest on record; National Weather Service records revealed that central Arizona was wetter than Seattle.²⁶

Across the three years, construction was slowed or stopped often due to persistent damage caused by heavy rains and rock slides. In 1993, floodwaters surged over Roosevelt's left spillway undoing the work that was underway and, worse, inundating the powerhouse.²⁷ Just as had been the case at the same construction site eighty-plus years earlier, repairing the damage was costly and time-consuming.²⁸ Reflecting on the experience, Dan Phillips, Manager of SRP Water Resource Operations, stated, "It was one of the best examples of working together because [between] the huge uncertainties, the unpredictable weather, the record runoff amounts, and the potential for major construction problems, you never knew what to expect." Many parties participated with SRP and the USBR in the Plan Six project: the Federal Highway Administration and the Arizona Department of Transportation worked on the bridge, and the Maricopa County Flood Control District as well as many Valley cities (Phoenix, Scottsdale, Mesa, Tempe, Chandler, and Glendale) shared in the costs of construction. In the final analysis, the reconstruction was the most expensive dam built by either the USBR or SRP.²⁹

Despite the many challenges faced during construction and reconstruction, the new Roosevelt Dam was worth the effort. As Governor Fife Symington joined SRP President William Schrader at the rededication event to push the symbolic release button—the same button pushed by Teddy Roosevelt at the original dedication eighty-five years earlier—confidence was high that extreme flood events on the Salt River would no longer threaten the Valley with the intensity of force that had been experienced over the past century.³⁰

DEREGULATION ON THE HORIZON

Even as the most significant period of change to the Arizona water system was nearing completion, another monumental challenge was on the horizon for SRP, this time on the other side of its business. In the 1990s, the electric power industry was undergoing a politically inspired reorganization that would test SRP at its core and ultimately forge new directions in power and customer services.

The move to deregulate electric utilities in the United States began in earnest following

the oil embargo of the 1970s when fuel prices skyrocketed, increasing retail power prices as well. The instability of the oil market encouraged utilities to build generating stations that would run on more price-stable fuel supplies. However, the rapidly escalating cost of new coal-fired and nuclear power plants, along with the attendant environmental policy uncertainties, meant continued increases in electricity pricing and consumer dissatisfaction. Consequently, proposals to change regulatory oversight began to capture the attention of the nation's policymakers.³¹ Across the administrations of Presidents Carter, Reagan, and Bush (1977 to 1993), a cohesive, bipartisan movement emerged which sought to modify the so-called "natural monopoly" system that had defined the electric industry since its beginning.³²

Legislation passed during this period focused on changing the way that electric utilities would generate, transmit, and deliver power by altering the regulatory and market structures in which they functioned.³³ It soon became clear that the complex nature of the industry would make the deregulation of electric power different from that experienced by other industries. Regulatory bodies and state legislatures had to figure out how to support competition in the power industry without violating the numerous laws and long-term contracts that had been entered into in good faith based on the existing monopoly system. In a "deregulated" market, it was unclear how utilities would pay back the huge investments in generating plants and transmission lines which were figured into their rates. Utility bonds were a pillar of the financial market and questions arose over the long-term bond returns that were based on those investments. It was difficult to sort out how to grant competitive access to long-distance lines with capacity that was sold out for the next fifty years. And there were concerns about public power versus private power—particularly whether one system had a competitive advantage over the other.

Since SRP was a long-standing, albeit unique, participant in Arizona's utility industry, understanding its role was crucial to the work of developing regulatory reform at the state level. One question Arizona policymakers needed to grapple with centered on how SRP would fit into the competitive environment, since unlike APS and other IOUs it was regulated by its own elected board of directors. SRP's additional role as the principal water supplier to the Valley complicated the equation. Nevertheless, SRP faced the same competitive pressure as other utilities. Its large industrial and mining customers were prime targets for other utilities seeking new customers, a serious concern since losing such major accounts would spread fixed costs over fewer units of sale, and higher rates would make SRP more vulnerable to competitors. The larger customers were critical in keeping SRP's rates low for its hundreds of thousands of residential and small business customers.³⁴

PREPARING TO COMPETE

As far back as the 1980s, recognizing that a new and different competitive market was on its way, SRP had taken steps to prepare the company for the coming changes. One of



Mead-Phoenix
transmission line
construction

the earliest efforts was the expansion of its power transmission grid to link with supply markets beyond SRP's own generating facilities inside Arizona and access bulk power supplies to yield a competitive advantage. Southern Nevada had become a crossroads of major power lines, where bulk power generated across the West could be bought and sold. Since the 1930s, resource planners had been proposing a link between the southwest and northwest power transmission grids. Their vision was realized in the 1980s when a consortium of agencies and utilities developed the Mead-Phoenix high-voltage line.³⁵ The Western Area Power Administration (WAPA), an agency of the US Department of Energy, had a 31 percent interest in the project, SRP and APS split 36.4 percent of the costs and ownership, and the remaining share was covered by southern California utilities.³⁶ The original filing for a Certificate of Environmental Compatibility to construct the project was granted by the ACC in 1985. The line was one of the longest transmission systems ever constructed and the first high-voltage line built in Arizona not tied to the output of a specific power plant. Beginning in November 1993, SRP, as project manager, constructed 256 miles of 500 kV

transmission line across rugged desert and mountain terrain between southern Nevada's Lake Mead area to a new receiving station in the northwest Valley.³⁷

SRP also addressed its internal practices. In November 1987, the District Board approved the adoption of a long-range strategic direction which focused on the future of SRP's key business functions—delivering water and power.³⁸ The water side of the company would continue providing an adequate supply to its shareholders with a strong emphasis on conservation efforts, groundwater recharge, water quality issues, participation in regional planning and policy development, and openness to new technology and business opportunities.³⁹ The new strategic direction for power services directly addressed the challenges of a deregulated market by focusing on the broad range of customer needs, expectations, and choices.⁴⁰

PLANNING FOR GROWTH

The need to prepare for a newly competitive electric industry was complicated, however, by impending changes in Arizona's persistent population growth and economic development. By 1985, the state was growing by approximately 100,000 people per year with 65 percent of new residents moving to the Phoenix area. Construction advanced faster in Arizona than in any other state, and only Los Angeles boasted higher construction of new housing than the Valley.⁴¹ The state, said *The Wall Street Journal*, "has been creating jobs and sucking in

money and migrants at a stupendous rate.⁴² Arizona had made growth “the state religion,” and businesses were moving to the Phoenix and Tucson metropolitan areas to take advantage of low taxes, low wages, cheap land, and minimal regulation.⁴³

A large part of the SRP power service territory was on the fringes of the Phoenix metropolitan area where the construction of new homes and businesses was heaviest. At the beginning of the 1980s, the number of power customers hovered at 300,000; by mid-decade, the number had grown to more than 450,000.⁴⁴ During this positive growth period, even the weather was cooperative, with wet winters producing enough moisture to fill the reservoirs and reduce groundwater pumping, but not enough to cause any flooding.⁴⁵ In 1987, SRP installed its 500,000th electricity meter, and the following year SRP achieved gross revenues of more than \$1 billion for the first time.⁴⁶ Yet the company’s 1987 Annual Report began, “The past fiscal year was filled with indicators of impending change—the threshold of a new era.”⁴⁷

The area’s growth had been partly fueled by people moving from areas of regional depression seeking jobs in the aerospace and electronics industries or in construction, finance, or real estate, all of which were feeding off the increase in manufacturing, tourism, and resort development. When the growth in manufacturing began to slow in 1986 and tourism leveled off, the developers of new homes, resorts, and offices were unwilling or unable to cut back on new projects. Lending for these developments continued apace, as banks and local savings and loan institutions sought to increase their leverage in the sizzling real estate market.⁴⁸ By the end of 1988, the bubble of the previous half-decade was deflating rapidly. There simply were not enough buyers for all the new houses or enough renters for the new apartments and offices. Builders and developers were defaulting on their land and construction loans, and bankers who had backed them realized they were overexposed.⁴⁹ By the end of the decade, the economic forecasts predicted a very slow recovery due to the persistent drag from the real estate market and construction industry.⁵⁰

CORONADO UNIT 3

As the decade progressed with the economic downturn negating earlier growth projections, SRP was dealing with what had become a troublesome investment at Coronado Generating Station. In 1983, SRP decided to advance the service date of Coronado Unit 3 (CGS-3) from 1997 to 1991 and began what it called “low-level” construction with the idea that this date could later be accelerated or delayed as conditions warranted. The decision to add a third unit at the plant outside St. Johns made sense at the time, when growth indicators for the Phoenix area were robust and PVNGS was facing delays and cost concerns, and few other power supplies were being developed.⁵¹

By the late 1980s, though, it became apparent that plenty of electricity was available in the region after all, and that putting CGS-3 online in 1991 would simply increase the growing glut of available capacity. At that point, though SRP had made a substantial investment, it was

estimated that delay or cancellation of the third unit might cost less in the long term than proceeding with the project. To determine the best course of action, General Manager Jack Pfister challenged his staff to review all the assumptions about the plant and compare them to other alternatives.

The new study revealed how quickly the environment was changing—not necessarily in bad ways. For example, conservation and demand-side programs initiated earlier in the decade were having some effect on reducing peak usage, thus contributing to a reduced need for new generation. Also, the addition of Plan Six to the CAP included the enlargement of Lake Pleasant. The increased water storage made it possible to pump and transport from the Colorado River most of the annual water needs in the fall, winter, and spring when the greatest demand for electricity was relatively low, leaving additional capacity available for summertime needs. Other power sources were becoming available on the grid, including the newly renovated Hoover Dam hydropower station and several new generating units in other western states. Not all this power would be available for purchase by SRP, but clearly there was a surplus of available power in Arizona.

The “buy rather than build” option began to look more attractive when the new study revealed that CGS-3 was larger than SRP would need for as many as fifteen years. Shutting down work on CGS-3 was a difficult decision, but it was clear that to continue construction would worsen the financial debt/equity ratios by which SRP bonds were rated, thus raising their interest rates.⁵² Because SRP has no stockholders and relies on bonds for large capital investments, an increase in bond interest would have a huge financial impact. All of these factors led the SRP Board, in February 1988, to postpone the startup of the plant to 2004.⁵³ A few months later, the entire CGS-3 project was canceled. Instead, SRP signed long-term contracts to buy up to 200 MW of power from other state utilities.⁵⁴

CGS-3 construction halted, additional plant components in laydown yard (foreground)



SOAR

The combination of declining economic forecasts and the looming specter of competition led SRP to reevaluate its internal practices as well. Between 1987 and 1993, several initiatives reshaped the utility's way of doing business and its culture. Plans already set in motion were revised. SRP had begun construction on a new Information Systems Building (ISB) in January 1987, part of a larger plan to develop the area around SRP's Project Administration Building.

SRP had acquired around 500 acres of mostly vacant land between Papago Park and the Salt River and set up a subsidiary, Papago Park Center (PPC), to develop it. The initial tenant was to be SRP itself, in a corporate headquarters complex of five buildings that would house 6,500 workers by the end of the century. The surrounding lands of the PPC were expected to support 9.5 million square feet of office, retail, and hotel space to be developed over the next thirty years.⁵⁵ An improvement district consisting solely of the PPC was formed to finance infrastructure improvements, including an extension of Priest Drive north to Van Buren and rerouting Washington Street and the Southern Pacific tracks.⁵⁶



Information Systems at SRP

SRP's commitment to new technology as a tool for improving efficiency began in 1941 with the installation of mechanical tabulating equipment to help keep track of payroll and customer accounting. By the mid-1950s, forty-seven employees operated punch card machines in the data processing department.

In the 1960s, SRP acquired the IBM 360, a state-of-the-art computer that introduced computer chips, operating system software, and new programming languages. The 360 (nicknamed "the friendly redhead" for the scarlet cabinets which housed its components) had a total storage capacity of 64,000 bytes (64 KB), about the same amount of data contained in a single Microsoft Word document today. Despite its comparatively limited capacity, the 360's key breakthrough was that it allowed SRP to create an "online" environment in which data stored in a central location could be accessed by employees at remote terminals.

Throughout the 1960s and '70s, SRP kept pace with advancements in computing power, purchasing new equipment to integrate into its business practices. In 1978, the Information Systems department was formed, and company growth, the rise of the personal computer, and vast advances in computing technology meant it soon assumed an important strategic role within SRP. As computer systems were dispersed across the company, it signaled the end of the centralized mainframe approach and SRP's focus changed from hardware to data resource management.

SRP's new Information Systems Building, a state-of-the-art facility which opened in 1989, reflected these changes. The building's central storage and care facilities for large computing equipment were repurposed to accommodate linked individual computer users. In 1992, PC technology was fully integrated at SRP, which invested in 3,000 individual computers for its staff.

Lola Anderson, keypunch supervisor, assists employees in operating SRP's keypunch machines to complete billing, employee payroll, and other processes, circa 1950s.



The newly constructed
SRP Information Systems
Building (ISB), circa 1990

The ISB was to be the model for the entire corporate complex, with modern design tailored to its role as the hub of information technology at SRP. Costs, however, were greater than anticipated, and as the financial picture worsened, preparations for the remaining four buildings in the complex were put on hold.⁵⁷

During this preparation period for deregulation, utilities across the country were cutting costs by reducing their workforces. APS laid off more than 600 employees during the summer of 1988; that same year, the Tennessee Valley

Authority reduced its workforce by 20 percent.⁵⁸ SRP had not had a general layoff of workers in many years, but with customer growth dropping markedly for the second straight year, SRP authorized a study of the organization's workforce and work processes.⁵⁹ The study's name, Salt River Project Organizational Assessment and Renewal (nicknamed SOAR), was meant to imply a gathering of momentum that would launch the company successfully into the era of deregulation and competition.⁶⁰ The focus was on making the organization more efficient and effective. Personnel reductions were expected to be relatively minor and accomplished mostly through "managed attrition"—early retirements or severance, reassignment within the company, and retraining and redeployment to jobs outside the company. In his communications with employees, Pfister presented his vision of a company where employees and managers worked together to create an atmosphere of continuous improvement, a "benchmark public utility" that would be "streamlined without being spartan."⁶¹

Assisted by a management consulting company, teams of SRP midlevel managers examined every aspect of operations.⁶² The process began in late 1988 and continued into 1989. Employee morale and productivity suffered as people worried about their futures.⁶³ Finally, in May 1989, the SOAR teams released their recommendations, shocking executive management and justifying the worst fears of employees. They called for the elimination of more than 1,000 jobs—17 percent of the workforce—cutting through all levels from hourly workers to executives. Generally, the SOAR team determined that the SRP management structure was top-heavy and the employee count was too high.⁶⁴

Over the next several years, SRP's workforce gradually decreased by more than 1,000 positions through a combination of voluntary severance packages, early retirements and internal reassignments. While difficult, the reductions accomplished a significant decrease in costs. Simultaneously, a second phase of SOAR was announced, and an implementation

team was charged with the daunting task of “building a cultural foundation for the future.”⁶⁵ Management wanted to remake SRP, not just shrink it, which meant a profound change in the organizational culture. The essential components of the new strategic direction included a new approach to performance accountability and “prescriptions for action” to implement critical processes.⁶⁶ The company restated its longtime mission in explicitly economic terms: “to be the low-cost supplier of high-value energy and water services.”⁶⁷ An important aspect of this mission was a goal—virtually a promise—that electricity rates would not be raised except to match inflation. As completion of SOAR Phase I wound down, a new program began. Maximum Effectiveness was an organization-wide movement for change as SRP faced the increasingly competitive utility environment, complete with new goals and objectives, corporate-wide values, and performance standards and measurements.⁶⁸

MOVING IN A NEW DIRECTION

In 1991, Pfister retired, and the selection of Carroll Perkins, Chief Financial Officer, as his successor represented a new commitment to financial concerns. Perkins—always “Perk”—was respected for his ethical and innovative work in SRP finance programming during the 1970s and 1980s. Among his ample accomplishments, he effectively worked with customers and the company to face energy shortages and cost increases, initiated new computerized customer billing and accounting systems, negotiated the sale of SRP interests in PVNGS, and led SRP in becoming the first municipal entity in the United States to market tax-exempt commercial paper, a short-term money-market debt instrument.⁶⁹ His financial sense became a foundation of the new SRP.⁷⁰ By the time Perkins assumed the position of general manager, some of the rhetoric of Maximum Effectiveness was winding down, but much of the substance of the program had been permanently installed at SRP, including strict financial goals. The traditional utility doctrine of setting electricity rates to cover expenses had been reversed and now expenses had to fit a budget determined by the existing revenue, with no increase in rates. In the decade following 1992, SRP not only avoided increases but also cut electricity rates three times.⁷¹

Sadly, Perkins’ tenure as general manager was cut short. He passed away in November 1993, shortly after failing health forced his resignation.⁷² His legacy, however, remained influential as SRP faced future changes that marked the transition into the new century. To facilitate the process of replacing Perkins, the SRP Board limited the field of potential successors to the existing six associate general managers, eventually selecting Richard H. Silverman, Associate General Manager of Law and Administrative Services. Like Perkins, Silverman was a career-long SRP employee; he had started in the Legal Department in 1966.

In a relatively short span of time, SRP employees had been buffeted by altered plans, staffing reductions, reorganizations, and significant high-level management changes. Silverman’s task was monumental—to address the day-to-day operations of a dynamic company, to move that company headlong into the unpredictable future of deregulation

and competition, and to replace internal upheaval with a much-needed sense of corporate stability. With little time to settle into his new role, Silverman and the company dealt with soaring summer temperatures, record-setting peak power demands, and advancing utility restructuring across the nation. Silverman shared, “What has struck me in the last couple of months is the rapidity with which competition is overtaking us.”⁷³

In June 1996, Silverman unveiled SRP’s Four Point Plan—a forward-looking document specifically designed to anticipate changes in the utility industry. The Four Point Plan focused on customer choice, distribution reliability, sustaining SRP’s public power status within its traditional service area, and expanding its retail sales outside that area with the creation of a for-profit, wholly owned subsidiary. SRP submitted the Four Point Plan to the ACC and the Retail Wheeling Commission, recently established by the Arizona state legislature, thus signaling its intention to move into the competitive arena. As additional federal policies paved the way for deregulation and state lawmakers prepared to introduce retail competition, the submission from SRP, along with input from other utility interests, provided valuable information for achieving deregulation of the electric utility industry in Arizona.⁷⁴

COMPETITION-READY IN ARIZONA

Proposed utility deregulation in Arizona required the state’s utilities to respond to local regulatory developments while simultaneously participating on the regional and national stage. At the end of 1996, the ACC formed the framework for deregulation with the passage of its Retail Electric Competition Rule, which by its terms permitted utilities to recover stranded costs, allowed customer choice, and unbundled the process of receiving electricity into four distinct utility services: generation, transmission, distribution, and metering and billing. The new ruling applied primarily to APS and TEP, the two major IOUs in Arizona. Nevertheless, it did provide that public utilities could participate in a deregulated environment through intergovernmental agreements with the ACC. The proviso, drawing from SRP’s Four Point Plan, meant residential and business customers in SRP territory ultimately would be able to select their power service provider with delivery of the energy via SRP’s power distribution system.⁷⁵

The Arizona legislature passed the 1998 Electric Power Competition Act, which included SRP, and by August of that year, after a vigorous public process, the SRP Board approved terms and conditions in August 1998, which addressed such issues as reliability, consumer protection, public benefit programming, stranded costs, and metering and billing.⁷⁶ “To my knowledge,” stated Bill Meek, president of the Arizona Utility Investors Association, “SRP is the first vertically integrated public power entity in the country” to adopt a “full-blown plan for competition for all of its customer classes. If not a miracle, that’s at least a major accomplishment.”⁷⁷

In the final stages of its preparations for competition, SRP created a for-profit subsidiary, New West Energy, an energy service provider (ESP) intended to market surplus electricity

outside the company's traditional service territory. Within a year, New West had become one of the most successful ESPs in the country, having contracted with hundreds of businesses for power delivery in California, which had deregulated its power markets a few years earlier.⁷⁸

The first week of 1999, New West filed an application with the ACC to become a certified ESP in Arizona, and in September, the commission approved New West Energy for power marketing to residential and business consumers once competition was officially underway.⁷⁹ While New West expected a high level of interest from residential customers, it planned to begin serving the residential market in phases starting with consumers in the Valley.⁸⁰

COMPETITION SUCCESS

The reality of deregulation, as it turned out, was significantly different from the rhetoric. In 2000 and 2001, California experienced unprecedented power shortages, skyrocketing price increases, and the threat of bankruptcy for the state's utilities. Nationally, events in California served as a warning. What had been a push for deregulation slowed to a crawl and in some cases a complete stop.⁸¹ In Arizona, California's energy crisis effectively put an end to deregulation and as a result, New West ceased marketing excess energy in 2001.⁸²

SRP was the first regional utility to be prepared for competition. SRP management and employees had been working hard for more than ten years to prepare the company for deregulation and competition. They built and improved facilities, reduced costs, cut rates, and focused tremendous energy on achieving a high level of customer satisfaction. The company's overall strategic goal was to keep its existing customer base in its traditional service territory—which was, after all, one of the fastest-growing regions in the United States. These efforts were recognized nationally as SRP employees and leadership celebrated top customer service honors in 1999 and 2000.⁸³

In the summer of 2002, the ACC officially halted the state move toward retail competition. Although the most revolutionary changes had not come to pass, SRP's experience in preparing for deregulation readied it for the modern realities of the power industry. Management reaffirmed the organization's Four Point Plan, believing it offered the necessary guidance to meet the uncertainties of the future.⁸⁴



CHAPTER THIRTEEN:

CENTENNIAL

SRP celebrated the 100th anniversary of its founding in 2003. As part of the celebrations, the organization reflected on its first hundred years, which were defined by its fundamental goal of delivering reliable, affordable power and water. The company's transition into a new century of service came at a time of considerable change, but many fundamental aspects remained the same.

Just as the Salt River Project was established in response to a severe drought, a century later, SRP, in collaboration with local, regional, and federal partners, developed varied plans, programs, and facilities in response to a prolonged dry period. With a focus on ensuring a future water supply, SRP developed new supply resources, participated in water rights matters, developed and applied new technologies from water measurement to groundwater development, and collaborated on a broad range of conservation and stewardship efforts.

On the power side of the company, SRP added new traditional generating assets to meet demand but also began to integrate renewable sources of energy into its portfolio. With strong roots in supporting area development, the organization continued to be driven by the needs of the ever-growing, ever-changing Valley and its shareholders and customers. This tradition helped spur a renewed commitment to customer service, centered on the development of new ways for those using SRP power to exercise choice.

WATER INNOVATION

Over its first century, SRP faced the vagaries of the weather by developing a diverse water portfolio, including storage reservoirs on the Salt and Verde Rivers, groundwater resources across the Valley, and supplemental supplies of CAP

water. In its centennial year, amidst growing concern over an extended drought, SRP joined water providers, users, and agencies across the Southwest to design new opportunities for future water supplies.

Beginning in 1995, precipitation levels remained abnormally low year after year, stressing entire forest ecosystems across much of the West. Watershed grasslands became tinder-dry, while lake, river, and stream levels dropped significantly.¹ In May 2002, the US Secretary of Agriculture declared Arizona a drought disaster area, and just a month later the Rodeo-Chedeski fire burned more than 450,000 acres on the Apache-Sitgreaves National Forest and the Fort Apache Indian Reservation.² More than 300,000 acres of the burned area was on the Salt River watershed, raising concerns over negative impacts on water quality and wildlife. A multiagency task force of state and federal agencies, including SRP, developed a coordinated stream and reservoir monitoring program to assist with statewide water operations.³

In September 2002, the SRP Board implemented a reduction in water delivery for 2003, an action they had not needed to take in more than fifty years, affecting SRP reservoir storage water, groundwater pumped through SRP wells, and excess CAP water acquired from the CAWCD.⁴ Across the Valley, municipal customers managed the cutback by utilizing other water sources, primarily groundwater pumping and purchasing water from CAP. Consequently, residential and commercial water users did not directly experience the drought to the extent Valley farmers did. For the agricultural community, the reduced water supply represented a very real problem and they responded by reducing crop production. Some farmers had private pumps that, though costly to run, improved their crop yields.⁵

During the drought years, Roosevelt Lake, with a capacity larger than all the other Salt River reservoirs combined, suffered a severe drawdown that led to a unique problem. As the lake lowered steadily over a five-year period, thickets of willow and salt cedar trees grew in the now-exposed rich lakebed soil and launched SRP into a new era of conservation management programming. The new vegetative growth became the home for a wide variety of birds, including the endangered southwestern willow flycatcher. The dilemma faced by SRP revolved around compliance with the Endangered Species Act of 1973. Once the rains returned to the watershed and flows moved into the reservoir, there would be little SRP could do to prevent inundation of the newly established flycatcher habitat. In 2003, SRP received a permit from the US Fish and Wildlife Service to offset the impacts to the flycatchers and three other protected bird species that resided near the Roosevelt Reservoir.⁶ SRP developed the Roosevelt Lake Habitat Conservation Plan, which established more than 2,200 acres of permanent flycatcher habitat in riparian zones across central Arizona to mitigate the loss of the flycatchers' reservoir homes. With a similar situation occurring in the Verde reservoirs, additional plans were initiated to minimize and offset harm to varied endangered species posed by reservoir operations.⁷

During the month of February 2003, welcome relief finally came to a parched Arizona with one of the wettest months in Valley history. The remarkable inflows from the watershed

improved the status of the Salt and Verde storage systems, but only up to 30 percent of total capacity. Senior Hydrologist Dallas Reigle commented, “We have a lot of catching up to do before we get back to normal.”⁸ The western United States was in the middle of a serious and protracted drought similar to the extended drought the Valley had struggled through a hundred years earlier—a drought which led to the creation of the Salt River reclamation project.

SRP was designed initially to supply water across approximately 250,000 acres of irrigated cropland on a seasonal basis. During the 1990s and early 2000s, as much as 3,000 acres of land per year was taken out of crop production and developed for urban and suburban expansion. Where once water was delivered across the Valley from thousands of delivery points along laterals and ditches to irrigate seasonal crops, in the new century, the water was delivered primarily to water treatment plants to support the demand of year-round urban water users. SRP’s water services remained fairly basic: store and deliver water, protect water rights, and plan for future water supplies for a continually growing Valley. The difference, however, was that the transition to a second century of service required advanced methods and technologies to support operations, watershed management, and environmental protection.

In response to the need for improved remote water data collection and monitoring on the watershed, SRP added a new, sophisticated technological process to its water measurement toolkit. Spatia, a cost-effective, state-of-the-art package of services, included data monitoring equipment that collected real-time information from distant sites, a low-Earth orbit satellite communication system for transmitting data, and information processing of the data into user-friendly text or graphics.⁹ By 2001, SRP water services employed Spatia on the watershed with the installation of stream gauges to collect low-river flow data and precipitation gauges to gather and transmit weather data every four hours.¹⁰ Soon Spatia expanded beyond SRP-only water measurement needs to a variety of other users, and the technology supported power services as well. For example, SRP’s large commercial electric customers managed daily energy use with the availability of real-time monitoring data.¹¹

COLLABORATIVE WATER PLANNING

Arizona’s continued population gains in the early 2000s also meant growth in towns and cities located on the Salt and

White amur
roundup, 2005



White Amur:

The Innovative Maintenance Crew

The unobstructed flow of water through its canals is essential to SRP’s water services. The constant need to remove moss and weeds has been managed in a variety of ways over the years, from chemical applications to employing men and machines to using horses, mules, sheep, and, most recently, fish. Early research and development efforts along with successful navigation of state policies for introducing foreign fish into Arizona waters resulted in the introduction of sterile white amur (a species of Asian carp) to a one-mile stretch of the Arizona Canal in 1980.¹² Then, in 1982, SRP and the Arizona Game and Fish Department launched the Cooperative Hybrid Grass Carp Study—the official beginning of what became SRP’s White Amur Program. Growing as long as forty inches and weighing in at up to thirty-five pounds, the white amur are capable of eating 75 percent of their own weight daily. Within a decade, most of the SRP canals hosted the fish as they proved their worth by reducing aquatic plant life, keeping maintenance costs down, and eliminating the need to use chemicals. During the annual canal dry-up, the fish are captured and removed to safe waters before being replaced—an activity so fascinating it became the center of community events in several Valley cities.¹³

Verde watersheds, leading to increased use of water upstream, a persistent concern for SRP. Protecting shareholders' rights to the Salt and Verde meant challenging water right applications while negotiating exchanges and water supply use opportunities. Regional planning groups, created to develop informed, mutually workable proposals, eased much of the friction over Arizona's valuable water resources.

After years of research and negotiations, several agreements with Arizona Indian tribes were finalized around the time of SRP's centennial. The San Carlos Apache Tribe Water Settlement was signed in 1999, resolving disputes over the tribe's claim to water in the Salt River.¹⁴

On February 24, 2004, Arizona's congressional delegation introduced the Arizona Water Settlements Act in Congress—legislation that would settle the landmark case involving Arizona water rights, as well as the repayment obligation owed to the federal government by Arizona for construction of the CAP. SRP was one of the principal parties in the historic Gila River Indian Community Water Rights Settlement Agreement along with the federal government, the Gila River Community, the State of Arizona, the Central Arizona Water Conservation District and numerous cities, towns, and irrigation districts. SRP President Bill Schrader and Gila River Indian Community Governor Richard Narcia signed the agreement April 9, 2004. At the signing ceremony, Governor Narcia said, "This settlement agreement and legislation is of critical importance to the Community's future, and we are very pleased to join SRP as they enter into this agreement with us. SRP has been a great friend to the Community in this process, and we look forward to completing it together." The legislation was approved in December 2004 and marked the end of a decades-long legal dispute among the thirty-five parties to the agreement.

In December 2010, the White Mountain Apache Settlement became law and ended another decades-long conflict between water users, providing additional certainty to SRP's customers and shareholders. The Fort Apache Reservation is home to the White Mountain Apache Tribe, whose membership includes approximately 15,000 people. The reservation is also home to the headwaters of the Salt River system, which serves as a major source to water users and providers throughout Arizona. The settlement provided a number of important benefits to the White Mountain Apache, including the quantification of their water rights, authorization of the Miner Flat Dam Project, and federal funds for the construction, operation, and maintenance of the project. SRP's shareholders and customers as well as other water providers in Arizona received additional certainty about water supplies due to the Tribe committing to provide waivers and releases of claims benefiting all Arizona water users in the Gila River and Little Colorado River basins.

With a focus on addressing shared water-related issues and customer satisfaction outcomes, SRP engaged Valley municipalities in a series of water planning forums. In 2000, SRP joined with the Arizona Municipal Water Users Association and five municipalities in a public information campaign to promote water conservation. The "Water—Use It Wisely" program launched a collaborative multimedia, multiyear effort to encourage and support public interest

in conservation measures.¹⁵ Looking beyond the Valley, SRP participated with state and regional institutions and agencies to implement water conservation and use programming, propose and support water-related legislation, and establish and support new water research projects.¹⁶

SRP representatives served on the twenty-member Governor's Water Management Commission, which met to study Arizona's water supplies, uses, management regulations, and practices. In 2000, Governor Jane Hull charged the commission with assessing the current state of Arizona's water laws and practices and recommending updates to the existing water laws.¹⁷ SRP representatives served on the commission's Technical Advisory Committee, various task forces, and subcommittees.¹⁸

The commission identified potential areas of improvement to support a long-term, effective water supply management program for the state.¹⁹ Near the end of 2001, after receiving the commission's report, Governor Hull stated, "This is an issue that will control the future of Arizona more than anything we ever do. Water is the gold of Arizona."²⁰

AUGMENTING WATER SUPPLIES

C.C. Cragin Dam is one of the most recent symbols of SRP retooling its water portfolio for the Valley, as well as providing fresh solutions for communities along the Salt and Verde watershed. C.C. Cragin (originally Blue Ridge Dam), which is located on East Clear Creek in Coconino County, was built by the Phelps Dodge Corporation in the early 1960s to secure additional water supplies for its expanding mining operations in Morenci. In 1962, SRP and Phelps Dodge collaborated to help the copper company supply water from the Black River to its mine in exchange for water for SRP shareholders from the proposed new dam. In order to move water behind the dam on East Clear Creek down to the Valley, it had to be pumped uphill and piped to the East Verde River.

The 187-foot-tall, 492-foot-long dam was completed in 1965, creating a 15,000-acre-foot reservoir, where water is diverted through a 4,400-foot tunnel and pumped vertically 435 feet into a pipeline. The water then flows through the pipeline for eleven miles before emptying into the headwaters of the East Verde River. Just before reaching the East Verde, the water spins a hydroelectric turbine that feeds back into the Cragin system and powers the pumps that move water into the pipeline.

In 2005, Phelps Dodge transferred operation of Cragin Dam to SRP as part of the Arizona Water Settlements Act of 2004. A few years later, SRP partnered with the Town of Payson to provide the community with a portion of Cragin's water supply. To prepare the Cragin system for Payson water delivery, SRP modernized the generator, pumps, and pipeline. Just as Cragin Dam brought various entities together in the 1960s to help secure water supplies for SRP and Phelps Dodge, the dam continues to help ensure the certainty of SRP and Payson's future water supplies.

The New River-Agua Fria River Underground Storage Project (NAUSP) marks another example of SRP retooling its water portfolio and an endeavor that took decades to come to

fruition. Like GRUSP, NAUSP allows water from several sources to be stored for future use in underground natural aquifers. SRP purchased land for NAUSP in 2004, and the first delivery of water arrived in 2006. Comprised of six basins, the recharge facility covers about 120 acres and receives treated water from several cities, as well as Salt, Verde, and Colorado River water supplies. The NAUSP project marked a partnership between SRP and several Valley cities in order to ensure a reliable supply of water, particularly during drought conditions.²¹

CANAL MULTIPLE USE

Early in the Valley's history, the utilitarian role of the canals in delivering much-needed water was essential for successful settlement. However, they also offered a secondary value—aesthetic and recreational enjoyment. The SRP canals and laterals defined the Valley landscape. From the earliest picnics along tree-lined banks, the waterways have been a destination point for community gatherings. In 1921, Phoenix developed the first formal plans to use canals as parkways, and the seeds of canal multiple use were planted.²² It took decades before plans became reality, in part due to cost, but also because of SRP's desire to protect the canals' primary function of delivering water. As the Valley's population quickly grew in the post-World War II years, neighborhoods and businesses rather than cultivated fields flanked the canal rights of way. The allure of the flowing water and linear stretches that defined the canal landscapes was undeniable, and in the early 1960s, local civic organizations, Valley cities, and Maricopa County petitioned SRP and the USBR to develop guidelines for recreational uses of the canals.²³ Canal multiple-use projects soon became a growing trend. Canal-side trails and parks, as well as commercial and public venues, were built, spurring business development along the waterways. SRP reframed its operation and maintenance protocols to allow for public access while maintaining its maintenance, safety, and environmental responsibilities.²⁴

By the late 1980s, SRP elected to take an active role in designing the urban landscape.²⁵ One example of the collaboration between SRP, a municipality, and the business community began in the early 1990s with a significant development in Scottsdale along the Arizona Canal. The Scottsdale Waterfront, a multifaceted redesign of the downtown area into a single retail corridor, incorporated one-half mile of the Arizona Canal. From the outset, SRP power and water services were engaged in the redesign and licensing, relocating power facilities, undergrounding power lines, and reconstructing the canal to accommodate both the new development and water transmission.²⁶

POWER DIVERSIFICATION

Early in the new century, the continued agriculture-to-urban transition, particularly in the southeast portion of the Valley and northwest Pinal County, drove increased “build and buy” activity by SRP for generation resources. SRP's diversified power portfolio included hydro, natural

gas, nuclear and coal, spot market purchases, and small but growing sources of renewable assets like solar power, landfill gas energy, low-impact hydropower, and wind-generated power. Growth projections called for more gas supply reliability and new coal-fired generation.

One development related to the deregulation trend of the 1990s was a sudden increase in the number of southwestern power plants. The glut of power which had existed in the late 1980s meant that no new large generating plants were built for an extended period of time, but by 1999, utilities and independent generating companies were planning at least twenty new power plants in Arizona. The plants were all fired by natural gas due to its low cost and environmental concerns. In 2001, SRP signed a long-term contract with Reliant Energy for the entire output of a new natural gas generating station in Casa Grande called Desert Basin.²⁷ Strategically, the power purchase agreement was expected to keep customer costs down by eliminating the need to go to the marketplace to purchase more expensive power. Within two years, SRP purchased Desert Basin outright, improving its power portfolio with additional long-term reliability.²⁸ During the same period, SRP redeveloped its Kyrene and Santan Generating Stations in the southeast Valley, also in response to extraordinary growth.²⁹ Initially, both projects faced some opposition from local residents, and SRP responded to concerns through information sharing via multiple neighborhood meetings.³⁰ Expanding the plants meant there was less need for unpopular high-voltage transmission lines in the southeast Valley since the entire capacity of the plants would be used to serve the surrounding areas. Construction design assured no net increase in air emissions and incorporated street-view aesthetic enhancements.

Shortly after these improvements were completed, SRP partnered in 2008 with TransCanada to purchase the entire output, 575 MW, of the Coolidge Generating Station. The Coolidge facility was completed in 2011 and offered an innovative type of natural gas-fueled turbine capable of reaching full capacity in ten minutes. The facility's quick start means it can be brought online to supplement high customer load or used in place of solar and wind power when they cannot be produced. SRP's commitment to the Coolidge Generating Station built in the flexibility to incorporate renewable energy while maintaining generation to meet customer needs.³¹

Between 2006 and 2009, SRP boosted capacity with a new unit at the existing Springerville Generating Station.³² The power from the new unit helped SRP continue to meet current customer needs as well as replace baseload generating capacity lost when Mohave Generating Station was closed in 2005. The accelerated construction of Unit 4, despite a major setback



New street view of the
Santan Generating Station

from a transformer fire at the site, demonstrated SRP's commitment to replacing lost generation and meeting customer needs as quickly as possible.³³

The extraordinary area growth was a catalyst for power infrastructure development as well. For more than a century, SRP has met the challenge of staying one step in front of rising new customer numbers and expansion across the Salt River Valley. Transmission systems have been regularly upgraded in response to new demand, including construction of new extra-high-voltage transmission corridors. In 2005, a coalition of power entities formed to launch the Pinal West-to-Southeast Valley/Browning 500 kV Transmission Project. Construction began in 2006 and was completed in 2014.³⁴ SRP partnered with APS to construct another 500 kV line in the Phoenix metropolitan area, which was placed in service in November of 2010.³⁵ The Capital Improvement Program at SRP is focused on maintaining efficiency and reliability with the existing, planned, and future generation, transmission, and distribution systems.³⁶

RENEWABLE POWER ENHANCEMENTS

Even as it increased its conventional generation capacity, SRP made a commitment to diversify its portfolio of power resources and incorporate renewable power into its energy mix. Through earlier research and development programs, the company had experimented with alternative technologies in power production, particularly solar energy. With some expertise in green energy production and a familiarity with advances in the industry, SRP cautiously moved in this new direction. Recognizing that alternative technologies like solar, landfill gas, low-head hydro, and wind energy were more expensive to produce than conventional power sources, some SRP customers elected to support the new direction and helped fund this next step in the utility and the state's future.

In 2001, another energy option came online for SRP customers—the Tri-Cities Generating Facility. This innovative project was a partnership among SRP, SRPMIC, and DTE Biomass Energy.³⁷ Tri-Cities was designed to utilize methane gas emitted at the Tri-Cities landfill to

power five 800 kW engines and produce 4 MW of power, enough for about 2,000 homes. The power produced at the new plant was combined with solar power, and in 2003, SRP folded in a third clean energy option—hydroelectric power produced at the new Arizona Falls Generating Station.³⁸

SRP's EarthWise Energy program began in that same year with the installation of 135 wind turbines in eastern New Mexico. SRP contracted with the Public Service Co. of New Mexico for 50 MW of wind-generated

Arizona Falls, 1913



electricity. By this time, more than 4,000 SRP customers participated in the green energy program.⁴⁵ The focus on customer choice led to a broad range of solutions for both residential and commercial customers.

In 2004, SRP launched a new initiative, its Sustainable Portfolio Principles which outlined a balanced program of customer service, resource conservation, pollution prevention, and regulatory compliance, as well as public outreach, education, and partnerships. Two years later, the SRP Board escalated the portfolio's implementation plan to an aggressive increase of sustainable power generation to 15 percent of the total generation portfolio by 2025.⁴⁶ In 2011, SRP upped the ante even further and committed to providing 20 percent of retail requirements from sustainable resources by 2020.

In pursuit of this goal, SRP began to develop Arizona's first commercial-scale wind power facility, the Dry Lake Wind Power Project, near Snowflake in October 2009.⁴⁷

During the same time frame, SRP signed a twenty-five-year contract with Iberdrola Renewables for 20 MW of solar photovoltaic energy from the Copper Crossing Solar Ranch in Florence.

In a continued effort to diversify generation, SRP purchased the output of Phase I of the Hudson Ranch geothermal plant, located in the Imperial Valley in California. The plant went online in early 2012, producing a steady 49 MW. In recent years, the company has continued to pursue additional opportunities to add to its growing renewable portfolio.

Apart from providing SRP's customers with renewable energy options, these new generation facilities gave a boost to their local economies. Congresswoman Ann Kirkpatrick, who represented District 1, including Navajo County, stated, "The Dry Lake wind farm will deliver jobs, help us diversify our energy sources and lower our utility bills. In these tough times, it is a shot in the arm for District 1."⁴⁸ The Copper Crossing site in Florence also afforded the small town job opportunities—Mayor Vicki Kilvinger called it "the best thing that ever happened to Florence."⁴⁹



Arizona Falls, 2003

Arizona Falls

During construction of the Arizona Canal in 1883, crews encountered an underground rock formation near 56th Street and Indian School Road. Rather than spend extensive time and labor leveling the rock, the crew decided to simply channel the canal over the drop. When water began to flow in the finished Arizona Canal in 1885, it cascaded over the rock formation, creating the Arizona Falls. The site soon became a popular recreation spot.³⁹

Around the turn of the century, the Phoenix Light & Fuel Company took advantage of the natural drop and built a hydroelectric plant at the site. On March 29, 1902, hydroelectricity from Arizona Falls powered the surrounding area for the first time.⁴⁰ However, a serious drought followed by a destructive flood event compromised the operation of the power plant and it soon fell into disuse.⁴¹ In 1910, the SRVWUA and USRS signed a contract for the construction of three hydropower plants on the Valley canals, and on May 24, 1913, the rebuilt Arizona Falls station went into operation.⁴² After nearly four decades of operation, Arizona Falls was taken out of service in 1950.⁴³

In 2003, Arizona Falls was once again reborn. The new hydropower facility, designed by renowned artists Lajos Héder and Mags Harries, showcases art, poetry, and technology. It was designed as a community recreation spot, allowing the public to enjoy the cooling mists of the falls as they did a century before.⁴⁴

INNOVATIVE POWER SERVICES

By the time SRP reached its centennial year in 2003, a variety of factors motivated the company to reimagine and reformulate customer service procedures. In the process of planning for the impending arrival of competition to Arizona's electrical market, SRP's customer and community connections paradigms shifted. Combined with advances in technology, SRP's new programs brought customers more choices, more information, and, ultimately, more control over their energy consumption.

Traditionally, utilities focused on managing demand for electricity by attempting to modify the energy use patterns of customers. By incentivizing the purchase and use of energy-efficient appliances and equipment and educating consumers on ways to reduce their use during peak hours, utilities were able to reduce demand and delay costly capital investment, either at existing power generating stations or by constructing new sources of generation. Prior to 1994, SRP categorized its customer base into two distinct sectors: residential and business. In the new competitive environment, the business sector alone was divided into twenty-five categories with shared characteristics and electricity service needs. In looking at its diverse customer base, SRP developed services designed to meet the variety of needs and expectations.⁵⁰

In 1996, the company rolled out a new brand under the simple SRP logo with the tagline "Delivering More Than Power."⁵¹ Under this new brand, SRP designed an ever-growing array of programs and collaborations, all designed to address the varied needs of populations served by the company. M-Power was one of the first examples of SRP's new customer-facing programming. In 1993, a small group of electric customers was invited to participate in a prepayment program whereby they would choose how to pay their electric bills. Instead of the traditional monthly billing, received after the energy is consumed, they could decide in advance how much they wanted to spend and pay in increments of days or weeks or for the month. M-Power allows customers to use strategically placed kiosk locations to purchase power and track their energy use with an in-home display.⁵² The success of the test program for SRP customers encouraged SRP to seek a prepayment option for all residential customers, and in 1999, SRP successfully rolled out the new M-Power plan. The technology was developed in collaboration with Motorola and met with immediate customer success, as most customers found they actually reduced their energy consumption and lowered their costs.⁵³ M-Power grew to over 154,000 customers by mid-2017 making it the largest electricity prepayment program in North America.⁵⁴

The Valley experienced many boom and bust cycles during the twentieth century, which caused SRP to adapt to various economic climates. The modifications were made to continue to provide water and power certainty. Although the Great Recession at the beginning of the twenty-first century was different than prior economic downturns in the Valley, SRP continued its history of looking forward by making strategic financial decisions, enhancing power and water infrastructure, and adapting its organization. SRP made these changes to deal with near-

term uncertainty as well as prepare for the eventual economic recovery in the long term. In order to make the necessary changes, SRP reflected, retooled, and redirected itself to provide fresh solutions to challenges facing the water and power industry. The plan included delays to planned construction of power plants and transmission lines, a 40 percent reduction to capital budget items, discontinuing all canal lining projects, stopping new well drilling, and reducing internal costs.⁵⁵ SRP also offered its customers a choice of programs and tools that allowed them to self-monitor consumption during the difficult and uncertain times of recession.⁵⁶

In May 2008, SRP implemented price changes that reflected new customer-focused practices. The company expanded on its popular Time-of-Use plan, which boasted more than 190,000 customers, making it the second largest of its type in the nation and reducing bills by an average of 7 percent. The additional programs offered customers a larger variety of billing plans and price variation. The new pricing program created three annual billing cycles for the year: winter (November through April), summer (May, June, September, and October), and summer peak (July and August), with higher prices for summer peak usage.⁵⁷ These higher summer prices were designed to encourage efficiency in energy's highest production cost time period.⁵⁸ As part of the May 2008 price changes, SRP launched new programs to assist low-income customers through the Service to Help Arizonans with Relief on Energy Program and increased credits available to customers under the Economy Price Plan.⁵⁹

Many of the new pricing plans were based on the use of smart meters, which were deployed starting in 2003. SRP's smart meter upgrade program installed its 400,000th meter by November of 2009 and earned SRP the Utility Planning Network's (UPN's) Global Metering Award for "Best Use of Smart Metering as a Customer Care Tool" in 2008.⁶⁰ UPN cited SRP's improved service with faster response time, greater customer access to information used to regulate consumption, wider participation in time-of-use price plans, and the development of a wider offering of time-of-use plans, like EZ-3.⁶¹

SRP's offering of energy efficiency programs increased tremendously as electricity use grew, climate change initiatives emerged, and customer needs changed. SRP's programs focus on demand-response efforts, investment in technology, and changing customer behavior in three targeted areas: residential customers, commercial customers, and peak demand reduction.⁶²

In addition to its energy-saving programs, SRP offers a variety of incentives and education initiatives in order to better inform customers about their energy use and ways to save. Residential customers receive the *Save With SRP* newsletter, which contains offers and tips on energy efficiency. A host of educational tools are available to commercial customers as well, including benchmarking tools and advice and rebate information.⁶³

The focus on customer choice in the effort to prepare for deregulation led to a wide offering of solutions for both residential and commercial customers. The positive reaction to these programs was evident in the numerous awards and recognition given to SRP for its commitment to placing its customers at the center of its business.

COMMUNITY

SRP has a long-standing history of commitment to the communities it serves. Public service was built into its very foundation, and its corporate goals are integrally linked to community engagement. Just as water and electric services grew and transformed with the specific needs of the Valley, this commitment to community service has expanded and developed over the decades.

SRP employees have been at the heart of the community outreach programming through volunteerism in support of SRP service programs, participation in local activities and boards across the Valley, and annual monetary contributions. They have consistently served their communities, from supporting development of the first Carnegie Library in Phoenix to holding clothing drives during the Depression, and volunteering with the Red Cross during World War II. Over the decades, employees have been engaged in SRP-designed service programs supporting a wide spectrum of special needs, including initiatives in education, neighborhood enrichment, health and human services, the environment, and the arts, all with the goal of improving the lives of children and families—SRP’s neighbors. By the 1990s, SRP developed a comprehensive volunteer program to help employees, retirees, and their families connect to community-based organizations, partnerships, and services.

At the time of the SRP centennial, community service and corporate outreach had become integral to company culture. In 2003, more than 85 percent of SRP employees donated their time and financial support to hundreds of local charities and nonprofits.⁶⁴

In its new century, SRP’s total corporate contributions totaled millions of dollars annually, supporting health and human services organizations and education-focused agencies and projects.⁶⁵ SRP also contributes to cultural, civic, and environmental institutions. The SRP spirit of social responsibility and volunteerism has been recognized twice, in 2000 and 2007, by the Points of Light Foundation, the most prestigious international recognition for corporate volunteerism. The award honors the employees’ individual volunteer efforts, plus the company’s community service programming and the policies and vision that support these activities.

In 2011, SRP launched its Dollars for Doers program, which offered employees the opportunity to earn funds for a nonprofit agency through volunteer hours.⁶⁶ SRP’s commitment to the communities it serves has remained unwavering through the cycles of prosperity and decline and will continue to be a pillar of the organization into the future.

CENTENNIAL

In the midst of the Great Recession, SRP celebrated the centennial of Theodore Roosevelt Dam—a symbol of certainty and steadfastness since its completion in 1911. The celebration was attended by world dignitaries and SRP employees alike and paid tribute to the monumental structure’s long service to central Arizona. Laying the cornerstone of

Roosevelt Dam marked the beginning of reliable water and power for the Salt River Valley. Over time, Roosevelt Dam and SRP came to stand for the vitality and promise of the greater Phoenix metropolitan area in an arid environment. On the occasion of the dam's centennial, US Senator Jon Kyl remarked, "Over the 100 years of hardship and expansive growth, through drought, depressions and wars, in partnerships and collaborations, embracing innovation and technological advancements, SRP has provided reliable water and power to central Arizona communities. Building on the experience of the past, SRP looks forward to a future where growth and change will be met with the same ingenuity, flexibility, creativity and strength that it has demonstrated since the dedication of Roosevelt Dam on March 18, 1911."⁶⁷



EPILOGUE

SRP was founded more than a hundred years ago as a collaboration among residents of the Valley who put their land up as collateral to secure the federal loans needed to build Roosevelt Dam. This visionary act led to a more reliable water supply for the area and, ultimately, the electricity that fueled growth. Today, as a community-based nonprofit utility, SRP continues to make forward-thinking decisions while being guided by its long history as the Valley's preeminent provider of high-value water and power. From its beginnings as a federal reclamation project operated by local farmers, SRP has grown into a regional water and power provider, supplying nearly 800,000 acre-feet of water annually and delivering power to more than a million customers.

SRP has remained a fixture in the Valley through eras of difficulty and growth. Just as SRP's Cragin Plan developments helped the Valley weather the Depression, SRP's leadership ensured that the organization continued to provide water and power during the Great Recession through careful financial management, cutting costs, and delaying capital projects. SRP's contributions to the growth of the Valley go beyond reliable water and power.

SRP has embodied the principle of stewardship since its inception. Today, this responsibility includes the protection of forest and watershed areas through a number of initiatives, including the Northern Arizona Forest Fund. The fund, a partnership between SRP and the National Forest Foundation, provides a means for businesses and residents to invest in restoration projects on the Salt and Verde River watersheds.¹ Since its 2003 centennial, SRP has added a number of traditional resources to its generation fleet, while also establishing a firm commitment to renewable energy as part of its portfolio. In fact, SRP's Board

established a goal of deriving 20 percent of SRP's energy from renewable resources by 2020. In 2014, SRP set additional goals to reduce greenhouse gas emissions, targets that will reduce carbon intensity by 24 percent from fiscal year 2014 levels over the next fifteen years, with a 40 percent reduction over the next thirty years. SRP will look to its Integrated Resource Plan to guide decision-making as it pursues these goals.

SRP recently completed a significant strategic planning effort to examine the current and projected future conditions in which it will operate. The intent was to develop specific insights into the future, build on those insights, and then work with our Board to craft a "winning proposition" to guide the future success of SRP. A clear winning proposition emerged: We win by being leaner, greener, and even more customer-centric. This proposition will anchor SRP's goals for the future.

Since its earliest days, SRP has been dedicated to providing a reliable water supply for the Valley. In recent years, SRP has demonstrated its commitment to addressing the drought with new partnerships and innovation. GRUSP embodies this commitment—since it began operations in 1994, SRP has delivered over 1 million acre-feet of water to GRUSP in an effort to replenish the Valley's aquifer.²

At SRP, our customers are our primary focus. As has been said, we are cost minimizers to our customers, not profit maximizers from our customers. In fact, SRP's inflation-adjusted prices are lower today than they were twenty-five years ago. SRP also strives to make service excellence a strategic advantage. As a result of these efforts, SRP has earned numerous prestigious customer satisfaction awards in recent years. Technology has become a major touchstone for building these customer relationships. From the implementation of the nation's largest prepaid plan, M-Power, to the deployment of a new generation of advanced metering devices, SRP will continue to focus on using technology to provide a world-class customer experience into our second century.

SRP's deep connection to the communities it serves has endured since its founding. In 2016, SRP volunteers spent nearly 37,000 hours serving over 213 nonprofits in their communities.³ SRP is also committed to ensuring the success of Arizona's teachers and students. It offers free resources, training workshops, in-service programs, and grant funds for educators—reaching over 200,000 Arizona students each year.⁴ SRP's dedication to safety extends to the community as well. SRP's Safety Connection™ program is aimed at educating the community on how to be safe around water and electricity.⁵

In 2011, after forty-five years at SRP (with seventeen years of service as general manager), Richard Silverman retired. Silverman led SRP through a number of challenges including deregulation, maneuvered through periods of economic growth and contraction, and participated in major water rights settlements. The SRP Boards selected then-Associate General Manager and Chief Financial Executive Mark Bonsall to take the reins. Since 2011, Bonsall has led SRP through economic difficulties while maintaining its stellar financial position,

simultaneously implementing changes across the organization to foster collaboration and creative problem-solving. In the coming century, SRP will face unknown challenges. In the short term, SRP will address meeting intensified environmental requirements, integrating new technology into the power grid, and the complex issues surrounding a prolonged drought. As always, SRP will look to its heritage for guidance in planning for the future.

—Mark Bonsall, General Manager and Chief Executive Officer,
and Richard Silverman, retired General Manager

ABBREVIATIONS AND ACRONYMS:

ACC	Arizona Corporation Commission	LAID	Lehi Agricultural Improvement District
ACFC	Agricultural Credit Finance Corporation	MW	megawatt
ADWR	Arizona Department of Water Resources	NGS	Navajo Generating Station
AMA	Active Management Area	PERA	Project Employees' Recreation Association
ANPP	Arizona Nuclear Power Project	PG&E	Pacific Gas and Electric Company
APS	Arizona Public Service	PL&FC	Phoenix Light and Fuel Company
BIR	Bureau of Internal Revenue	PPC	Papago Park Center
CALAPCO	Central Arizona Light and Power Company	PVID	Paradise Verde Irrigation District
CAP	Central Arizona Project	PVNGS	Palo Verde Nuclear Generating Station
CAWCD	Central Arizona Water Conservation District	PWA	Public Works Administration
CCAP	Citizens Concerned About the Project	RAID	Roosevelt Agricultural Improvement District
cfs	cubic feet per second	RFC	Reconstruction Finance Corporation
CGS	Coronado Generating Station	RID	Roosevelt Irrigation District
CGS-3	Coronado Generating Station, Unit 3	RWCD	Roosevelt Water Conservation District
CSIF	CAP-SRP Interconnect Facility	SCE	Southern California Edison
DOI	Department of the Interior	SOAR	SRP Organizational Assessment and Renewal
EBA	Employee Booster Association	SRP	Salt River Project
ESP	energy service provider	SRPA	Salt River Project Archives
GRIC	Gila River Indian Community	SRPAIPD	Salt River Project Agricultural Improvement and Power District
GRUSP	Granite Reef Underground Storage Project	SRPMIC	Salt River Pima-Maricopa Indian Community
IBEW	International Brotherhood of Electrical Workers	SRVWUA	Salt River Valley Water Users' Association
IOU	investor-owned utility	TEP	Tucson Electric Power
ISB	Information Systems Building	USBR	US Bureau of Reclamation or Bureau of Reclamation
JSS	Jennings, Strouss & Salmon (formerly Jennings, Strouss, Salmon & Trask)	USFS	US Forest Service
kV	kilovolt	USGS	US Geological Survey
kW	kilowatt	USRS	US Reclamation Service
LADWP	Los Angeles Department of Water and Power	VRIPD	Verde River Irrigation and Power District

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INDEX

- 15 percent area, 57
- 1917 Contract, I, 36–38, 47, 68, 104
- Active Management Areas (AMAs), 130
- Agricultural Credit Finance Corporation, 64–65, 70
- Agricultural Improvement District Act, 1922, 67–68; amended 68–69
- Agua Fria Generating Station, 101, 106
- Agua Fria River, 13, 17, 44, 124, 127, 129, 132
- Agua Fria Water and Land Company, 13
- Akers, Stan, 119
- Aldrich v. SRVWUA*, 43
- Alexander, Les, 84, 103
- Andrus, Cecil, 130
- Apache-Sitgreaves National Forest, 11, 99, 100, 154
- Apache Trail, 20, 29, 53, 56. *See also* Mesa-Roosevelt Road
- appropriation of water, 5–6, 28, 82, 136
- appurtenance, 5–6, 28
- Arizona Canal, 4–5, 6, 17, 26, 30, 42, 45, 72, 88, 95, 97, 124, 155, 158, 161. *See also* Arizona Canal Company, Arizona Improvement Company
- Arizona Canal Company, 4–5. *See also* Arizona Improvement Company
- Arizona Center for Law and the Public Interest, 120
- Arizona Corporation Commission (ACC), 119, 144, 150–151
- Arizona Department of Water Resources (ADWR), 130, 137, 138, 140
- Arizona Falls, 30, 160, 161
- Arizona Game and Fish Department, 98, 100, 124, 155
- Arizona Improvement Company, 5, 7. *See also* Arizona Canal Company
- Arizona Legislature, 11, 68–69, 82, 107, 119, 126, 130, 132, 137, 139, 140, 143, 150
- Arizona Municipal Water Users Association, 156
- Arizona Nuclear Power Project (ANPP), 115
- Arizona Public Service Company (APS), 93, 104–107, 111, 113, 115, 119, 143, 144, 148, 150, 160. *See also* Central Arizona Light and Power Company (CALAPCO)
- Arizona State University (ASU), III, 132, 133
- Arizona v. California*, 52, 110, 136
- Arizona Supreme Court, 68, 81, 82, 103–104
- Arizona Water Banking Authority, 140
- Arizona Water Company, 26
- Arizona Water Resource Committee, 98
- Arizona Water Settlements Act, 2004, 156–157
- Army Corps of Engineers, 124, 128
- Auxiliary Eastern Canal Landowners' Association, 45. *See also* Roosevelt Water Conservation District (RWCD)
- Babbitt, Bruce, 119, 126, 128, 130, 131
- Ball v. James*. *See James v. Ball*
- Barr, Burton, 131

- Barrett, Hilp, and Macco Corporation, 69–70
Bartlett Dam, 66–67, 69–70, 71, 125, 127, 141
Bartlett Lake, 70
Bechtel Power Corporation, 111, 115
beneficial use, 5, 6, 28
Black Mesa, 111–113
Black Mesa and Lake Powell Railroad, 113
Black River, 74, 99–100, 136, 157
Blue Ridge Dam, *See* C. C. Cragin Dam
Board of Survey, 36, 43
bonds, 10, 13, 14, 19, 36, 52–53, 55, 57–58, 62, 65–69, 103, 117, 118–119, 125, 146
Bonsall, Mark, 168–169
Brandow, Glen, 84
Bridge Canyon, 110
Bristor v. Cheatham, 82
Bryce Canyon National Park, 116
Buckeye Irrigation Company (BIC), 74
Buckeye Irrigation District, 118
Bureau of Internal Revenue (BIR), 75–76
Bush, George H. W., 143
canal multiple use, 158
CAP-SRP Interconnect Facility (CSIF), 139–140
Carey Act, 1894, 13
Carpenter, E. K., 104
Carrick and Mangham Agua Fria Lands and Irrigation Company, 44. *See also* Roosevelt Irrigation District (RID)
Carter, Jimmy, 128, 131, 143
Cave Creek Dam, 42
C. C. Cragin Dam, 157
Central Arizona Light and Power Company (CALAPCO), 52, 54–55, 56–57, 93, 102, 104–105. *See also* Arizona Public Service (APS)
Central Arizona Project (CAP), 52, 80, 82, 107, 110–11, 113, 121, 123, 128–132, 135, 138–141, 153–154, 156
Central Arizona Water Control Study, 128
Central Arizona Water Conservation District (CAWCD), 131, 154
Chandler, City of, 104, 142
Citizens Concerned About the Project (CCAP), 128
Civil Rights Act, 1964, 117
Cliff Dam, 129–33
Coconino National Forest, 99
Coconino County, 100, 157
Colorado River, 52, 80, 85–86, 87, 101, 103, 110, 113, 116, 123, 128, 129, 136, 139–141, 146, 156, 158
Colorado River Storage Project (CRSP), 101–102, 107
Consolidated Canal, 5, 10, 26–27, 29–30
Coolidge Generating Station, 159
Copper Crossing Solar Ranch, 161
copper industry in Arizona, 29–30, 32, 52, 55–56, 61, 64, 74, 79, 86, 157
Coronado Generating Station (CGS), 113–114; Unit 3 (CGS-3), 145–146
Cory, H. T., 59
Cory Report, 59
cotton, 41, 62
Cottonwood, City of, 99
Cragin, Charles C. “C. C.”, 40, 49–59, 62–63, 64, 66, 105, 167
Cragin Plan, 51–59, 167
Craig Generating Station, 102
Crosscut Canal, 5, 73, 90, 97
Crosscut Diesel Station, 72, 101
Crosscut Hydroelectric facility, 30, 72
Current News, 73, 90
Davis, Arthur P., 14, 20, 35, 37
Defense Plant Corporation, 74
Department of the Interior (DOI), 16, 36–37, 41, 43, 46, 104, 114
deregulation, 142–143, 148, 149–151, 159, 163, 168
Desert Basin Generating Station, 159
Dobson, John H., 62–63
Dollars for Doers, 164
drainage, 41–44, 68
Dreamy Draw, 124–125
drought: 1898–1904, 10, 15, 24, 28, 142, 161; 1920s, 61; 1930s, 66, 69, 71; 1940s to 1960s, 81–82, 94, 99, 123; 1990s to 2000s, 154–155, 168–169
Dry Lake Wind Power Project, 161
“Dry Landers”, 36–37, 43, 51
Duncan, Nina, 73, 90
East Clear Creek, 11, 157
Eastern Canal, 26, 45

- EarthWise Energy Program, 160
 effluent, 118–119, 120
 Electric Power Competition Act, 1998, 150
 Elliott, W. R., 38, 40, 50, 72
 Ely, Northcutt, 64
 Employee Boosters Association (EBA), 90–91
 Endangered Species Act, 131, 154
 energy efficiency, III, 163
 Environmental Policy Act, 1969, 112
 Equal Pay Act, 1963, 117
 Fannin, Paul, 107
 Farmers' Ticket, 63
 Federal Farm Board, 62
 flood: 1891, 10; 1905, 24–26, 161; 1920s, 42; 1936–37, 69; 1965–66, 124–125; 1978–1980, 126–127, 133; 1993, 142
 forest management, 10–11, 98, 167. *See also* Northern Arizona Forest Fund, National Forest Foundation
 Forest Management Act, 1897, 10
 Fort Apache Indian Reservation, 99–100, 136, 154, 156
 Fort McDowell Indian Community, 129, 138
 Fort McDowell Indian Reservation, 128
 Four Point Plan, 150–151
 Fowler, Benjamin A., 13–17, 35
 fractional-acreage voting, 119
 frequency upgrade, 84, 86
 General Land Law Revision Act, 1891, 10
 General Stream Adjudication, 135–137, 138
 Gila River, 15, 17, 73, 74, 124, 136–137, 156
 Gila River Indian Community (GRIC), 138, 156
 Gila River Reservation, 17, 43
 Glendale, City of, 5, 29, 104, 142
 Gilbert, Town of, 104
 Glen Canyon Dam, 101
 Goldwater, Barry, 107
 Goodyear Tire and Rubber Company, 41
 Grand Canal, 5, 30, 39, 133, 139
 Grand Canal Company, 5
 Grand Canyon National Park, 110, 116
 Granite Reef, 4
 Granite Reef Diversion Dam, 25–27, 34, 39, 41, 45, 46, 50, 51, 57, 87, 125, 132, 139, 140
 Granite Reef Underground Storage Project (GRUSP), 139–141
 Great Depression, 46, 61, 64–65, 70, 76
 Great Recession, 162–163, 164, 167
 groundwater, 5, 20, 29, 31, 36, 42, 62, 67, 81–83, 93, 113, 124, 129–130, 137–140, 141, 145, 153–154; recharge, 139–141, 144, 158. *See also* Groundwater Code of 1948; Groundwater Management Act, 1980; Groundwater Transportation Act
 Groundwater Code of 1948, 82
 Groundwater Management Act, 1980, 130, 137, 138
 growth: impact on SRP's water system, 81, 87, 93, 123, 138–140, 155–156; of SRP's electric system, 52, 63, 86, 93, 100–101, 109–110, 120–121, 144–145, 159–160; of the Valley, 6–7, 42, 52, 79–80, 86–87, 93, 105, 107–108, 110, 120–121, 124, 135, 144–145, 159–160, 165, 167, 168. *See also* urbanization
 Gust, John L., 63
 Habitat Conservation Plan, 154
 Harding, Warren G., 52
 Harrison, Benjamin, 10
 Hawley Lake, 100
 Hayden, Carl, 37, 52
 Hayden Generating Station, 102
 Hayden, Thomas A. "T. A.", 54, 56, 99
 Heard, Dwight B., 16
 Henshaw, Fred, 83
 Hickel, Walter, 113
 Highland Canal, 10, 17, 26
 Hill, Louis C., 26, 31
 Hodel, Don, 131
 Hohokam, 1–2, 3, 6
 Hoover Dam, 86, 146
 Hoover, Herbert, 62, 64
 Horse Mesa Dam, 51, 55–56, 57, 58, 66, 127
 Horseshoe Dam: and City of Phoenix, 75, 94; construction, 74–75; exchange agreement with Phelps Dodge, 75, 78; safety of dams modifications, 141; site, 45–46
 Howell Code, 6
 Howell, William, 6
 Hudson Ranch Geothermal Plant, 161
 Hudson Reservoir and Canal Company, 13–14, 19

- Hull, Jane, 157
- Hurley v. Abbott*, 27–28, 99, 136. *See also* Kent Decree
- Hydroelectricity, II, 5, 19, 20, 26, 29–30, 37, 49–51, 54–59, 81, 86, 101, 158–159, 160–161
- Ickes, Harold, 65–66, 76
- income tax, 75–76, 78
- Information Systems Building (ISB), 147–148
- Indian Bend Wash, 42, 124, 125
- Indian water rights settlements, 137–138;
Arizona Water Settlements Act, 2004, 156, 157; Fort McDowell Indian Community Settlement, 38; Gila River Indian Community Settlement, 38, 156; Salt River Pima-Maricopa Indian Community (SRPMIC) Settlement, 138; San Carlos Apache Settlement, 38, 156; White Mountain Apache Settlement, 156; Zuni Settlement, 38
- Inspiration Consolidated Copper Company, 30, 52, 55–56
- Integrated Resource Plan, 168
- International Brotherhood of Electrical Workers (IBEW), Local 266, 76–77
- James v. Ball*, 120
- Jennings, Strouss & Salmon (JSS) *also* Jennings, Strouss, Salmon & Trask, 85, 117, 120, 130
- Johnson, Lyndon B., 110, 117
- Kaiparowits Generating Station, 116
- Kent Decree, 28–29, 36, 99, 136. *See also* *Hurley v. Abbott*
- Kent, Edward, 28, 99
- Kibbey Decree, 6, 28. *See also* *Wormser v. Salt River Valley Canal et al.*
- Kibbey, Joseph, 6, 15, 26–27, 35, 37. *See also* *Wormser v. Salt River Valley Canal et al.*
- Kilvinger, Vicki, 161
- Kirkpatrick, Ann, 161
- Kyl, Jon, 120, 130, 165
- Kyrene Generating Station, 101, 159
- Lake Havasu, 110, 113
- Lake Pleasant, 146
- Lake Powell, 111
- Lane, Franklin K., 35–38, 46
- Lawson, Harry, “H. J.”, 54, 63, 80, 81, 84
- Lee, Rex, 120
- Lehi Agricultural Improvement District (LAID), 43–44, 55
- Little Colorado River, 137, 156
- Los Angeles Department of Water and Power (LADWP), 111, 113, 116
- Marble Canyon, 110
- Maricopa Canal Company, 5
- Maricopa County, III, 13–14, 16, 42, 59, 125, 133, 158
- Maricopa County Board of Supervisors, 35, 68
- Maricopa County Flood Control District, 124, 126, 131, 142
- Maricopa County Superior Court, 6, 103
- Maximum Effectiveness, 149
- Maxwell, George H., 13–15
- McCain, John, 132
- McFarland, Ernest, 74
- McMullin, Roderick J. “Rod”, 84–85, 88–89, 91, 95, 105, 110–111, 117
- McKinley, William, 10
- Mead, Elwood, 62, 66
- Mead-Phoenix Transmission Line, 144
- Mesa Canal, 6, 26
- Mesa, City of, 5, 19, 29, 58, 93, 102–104, 142
- Mesa-Roosevelt Road, 20. *See also* Apache Trail
- Miami-Superior Transmission Line, 51
- Michael, Leroy, 130
- mining in Arizona, 62, 64, 74, 130
- Minotto, James, 62–63
- Mohave Generating Station, 159
- Monette, Lawrence, 105
- Mormon Flat Dam, 43, 45, 51–55, 56, 57, 58, 66
- Morong, Tom, 84, 86
- M-Power, 162, 168
- Murphy, William John “W. J.”, 4, 6
- Narcia, Richard, 156
- Navajo Generating Station (NGS), 109–113
- Navajo Nation, 110–111, 113
- Navajo Tribal Utility Authority, 111
- National Forest Foundation, 167
- National Labor Relations Act, 76
- National Reclamation Act, I, 14, 17, 29, 34–36, 50
- New River-Agua Fria River Underground Storage Project (NAUSP), 140, 157–158
- New West Energy, 151
- Newell, Frederick, 14–15, 35

- Newlands Bill, 14
- Newlands, Francis G., 14
- Norman, O. L. “Tex”, 84–85, 86
- Northern Arizona Forest Fund, 167
- Northside Camp, 39
- Ocotillo Plant, 106
- Orme Dam, 127–129, 132
- Orme, John P., 35, 37, 39, 63, 128
- Orme, Lin, 63, 66, 67, 73, 76, 81, 83
- O’Rourke, J. M., 24–25
- Osborn, Sidney, 82
- Pacific Gas and Electric Company (PG&E), 29, 50, 52, 102
- Palo Verde Nuclear Generating Station (PVNGS), 113, 115–116, 135, 145, 149
- Papago Park, 30, 42, 72–73, 91, 147
- Papago Park Center (PPC), 147
- Paradise Valley, Town of, 13, 46
- Paradise Verde Irrigation District (PVID), 45–46. *See also* Verde River Irrigation and Power District (VRIPD)
- Parker Dam, 86
- Patrick T. Hurley v. Charles F. Abbott et al. See Hurley v. Abbott*
- Payne, John Barton, 46
- Payson, Town of, 99, 141, 157
- Peabody Coal Company, 111, 113
- Peoria, City of, 5, 42, 104
- Perkins, Carroll “Perk”, 149
- Pfister, Jack, 114, 117, 126, 128, 129, 137, 146, 148, 149
- Phelps Dodge Corporation, 74–75, 157
- Phoenix, City of, 2, 7, 14, 19, 20, 29, 31, 42, 59, 61, 75, 80, 93–95, 100, 102, 104, 118, 124, 130, 142, 158
- Phoenix Light and Fuel Company (PL&FC), 26
- Pickrell, Bill, 95, 105
- Pierce, Vaughn, 84
- Pinal County, 105, 130, 158
- Pinal West-to-Southeast Valley/Browning 500 kV Transmission Project, 160
- Plan Six, 129, 131–133, 135, 141–142, 146
- Points of Light Foundation, 164
- power peak, 95, 101, 146, 150, 163
- Prescott, City of, 51, 130
- Prescott National Forest, 99
- Prisoners of war (POW), 72–73. *See also* Camp Papago Park
- Project Administration Building, 91, 147
- Project Employees’ Recreation Association Club (PERA Club), 90
- Project Women’s Exchange, 118
- property tax, 107–108
- Prunepickers, 84–85, 90, 91
- Public Service Co. of New Mexico, 160
- Public Works Administration (PWA), 65–67
- Pulliam, Eugene, 107
- Pulse*, 73
- railroad, in the Valley, 6, 7, 13, 59; Southern Pacific Railroad, 20, 31; Santa Fe Railroad, 31. *See also* Black Mesa and Lake Powell Railroad
- rainmaking, 99
- Reagan, Ronald, 131, 138, 143
- Reclamation Extension Act, 1914, 35
- reclamation: movement, 7, 9, 12–15, 17; Western reclamation, I, 13, 17, 19, 29, 31, 34–38, 41, 47, 50, 52, 66, 87; law, 36, 38, 52, 94
- Reconstruction Finance Corporation (RFC), 64–67, 69
- Rehabilitation and Betterment Act, 1949, 87–88, 96–97
- Reid, Francis A. “Frank”, 40–43, 49–50, 52–53, 55, 58–59, 63, 66
- repayment of federal loans, 15, 16, 19, 33–36, 41, 50, 61–63, 66, 70, 87, 119
- renewable energy, 154, 159, 160–161, 167–168
- Rhodes, John, 128
- Riggins, Ted, 93, 104
- Rio Salado project, 132–133
- Rio Verde Canal Company, 13, 45
- Rodeo-Chediski Fire, 154
- Roosevelt Agricultural Improvement District (RAID), 43–44, 55
- Roosevelt Dam—*See* Theodore Roosevelt Dam
- Roosevelt, Franklin D., II, 66
- Roosevelt Irrigation District (RID), 43, 55
- Roosevelt Lake—*See* Theodore Roosevelt Lake
- Roosevelt, Theodore, III, 10, 14, 30
- Roosevelt, Town of, 24–25

- Roosevelt Water Conservation District (RWCD), 45–46, 74. *See also* Auxiliary Eastern Canal Landowners' Association
- rural electrification, II, 57–58, 71, 105
- Rural Electrification Act, 1936, II, 58
- Safety Connection, 168
- Safety of Dams Act, 127–128
- Salt River Indian Reservation, 46. *See also* Salt River Pima-Maricopa Indian Community
- Salt River Pima-Maricopa Indian Community (SRPMIC), 138, 140, 160. *See also* Salt River Indian Reservation
- Salt River Project Agricultural Improvement and Power District: 1937 contract and, 68–69, 76; 1949 contract and, 76, 78, 85; financing and, 69, 71; formation of, 67–69; governance changes to, 67–69, 118–120
- Salt River Valley Canal, 2, 5, 6, 15, 28
- Salt River Valley Water Users' Association: 1906 contract and, 26; 1910 contract and, 161; 1917 contract and, I, 36–39; 1937 contract and 68–69, 76; 1949 contract and 76, 78, 85; formation of, 15–17; Articles of Incorporation, 15–17, 57, 68; governance of 15–17, 118–119
- San Carlos Apache Reservation, 136. *See also* San Carlos Apache Tribe
- San Carlos Apache Tribe, 138, 156. *See also* San Carlos Apache Reservation
- San Francisco Canal, 6
- Sargent, Henry B., 105
- Schrader, Bill, 142, 156
- Searles, Dick, 83–85, 107
- Service to Help Arizonans with Relief on Energy, 163
- Scott, Grieg, 63, 84–85
- Scottsdale, City of, 104, 124, 142, 158
- Scussel, Frank, 104
- Shipley, Henry, 84, 124
- Sierra Club, 110, 114
- Silverman, Richard H., 149–150, 168–169
- Simons, Louisa, 90
- Sloan, Richard, 62–63
- smart meters, 163
- SOAR, 147–149
- South Canal, 26, 30, 139, 140
- Southern California Edison Company (SCE), 84, 116
- Southwestern Sugar and Land Company, 29
- Southside Camp, 39
- Spatia, 155
- Springerville Generating Station, 113, 159–160
- St. Johns, City of, 113–114, 145
- State Land Department, Arizona, 82, 98, 137
- Stewart Mountain Dam, 56–59, 61, 66, 99, 104, 126–127, 141
- strategic planning, 168
- Sustainable Portfolio Principles, 161
- Swilling's Ditch. *See* Salt River Valley Canal
- Tempe Canal, 4, 5, 6, 16, 17, 26–27, 30, 32, 97
- Tempe Canal Company, 4, 16, 26–27, 43
- Tempe, City of, 4, 19, 52, 91, 104, 105, 106, 127, 142
- Tempe Town Lake, 133
- Territorial Agreements: CALAPCO, 56–58; APS, 102–106
- Theodore Roosevelt Dam: centennial, 164–165; construction of 19–25, 30–31; dedication of 30–31; first spill at, 31–32; hydroelectricity, 19–20, 29–30, 40, 50, 86; modifications to 52–53, 141–142; power canal, 19–20, 29–30; rededication ceremony, 142; transmission line to Mesa and Phoenix, 29–30
- Theodore Roosevelt Lake, 31, 43, 50, 99, 154
- Tonto Dam Site, 14–15
- Tonto National Forest, 11
- Townsite Act, 1906, 29, 50
- Tri-Cities Generation Facility, 160
- Tucson Electric Power (TEP), 111, 113, 119, 150
- Udall, Morris, 128
- Udall, Stewart, 110
- urban irrigation service, 97
- urbanization, 80, 87, 89, 93, 95–96, 119, 124. *See also* growth
- US Bureau of Reclamation (USBR), 46, 56, 62, 65–67, 70, 74–75, 80, 82–84, 102, 104, 111, 131, 139, 141–142, 158. *See also* US Reclamation Service
- US Congress, 34, 69. *See also* US Senate
- US Court of Appeals, 120
- US Department of Energy, 144
- US Fish and Wildlife Service, 132, 154
- US Forest Service, 98
- US Geological Survey (USGS), 14, 15, 98

- US Indian Service, 46
- US Reclamation Service (USRS), 15–16, 19–20, 24–27, 29–31, 33–36, 38, 40–41, 46. *See also* US Bureau of Reclamation
- US Senate, 34, 46, 52. *See also* US Congress
- USS Arizona*, 32
- Utah Canal. *See* Utah Irrigating Ditch
- Utah Irrigating Ditch, 6, 43
- Valley Bank, 41
- Verde River Irrigation and Power District (VRIPD), 46–47, 65–66. *See also* Paradise Verde Irrigation District (PVID)
- victory flag, 73
- volunteerism at SRP, 164, 168
- Waddell Dam, 128–129
- Wake, Neil, 120
- Ward, Stan, 84–85, 91, 105
- Warren, Francis E., 14
- water rights, 5–6, 10–12, 14–16, 19, 25, 28, 36, 43, 46–47, 65, 74, 94, 99, 100, 135–139, 156, 168. *See also* Kent Decree, *Hurley v. Abbott*, Indian water rights settlements
- Water Storage Committee, 13–16
- watershed, Salt and Verde, 4, 10–11, 74, 98–100, 124, 135–136, 142, 154–156, 167
- Water Temple, 35, 91
- Watt, James, 129
- Western Area Power Administration (WAPA), 144
- Western Canal, 27, 39
- Western Energy Supply and Transmission Associates, 116
- white amur, 155
- White Mountain Apache Tribe, 100, 136, 156
- White River, 100
- Wilbur, E. W., 16
- Wilbur, Ray Lyman, 62, 65
- Wilkinson, Frank M., 39–40
- Wilson, Woodrow, 35
- Winters v. United States*, 135–136
- World War I, 41, 80
- World War II, 70, 71–74, 79, 93, 164
- Wormser v. Salt River Valley Canal et al.*, 6, 15, 28
- Yaqui, 39, 90
- zanjero, 39, 77, 88–89, 90, 97
- Zion National Park, 116
- Zuni Tribe, 138



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